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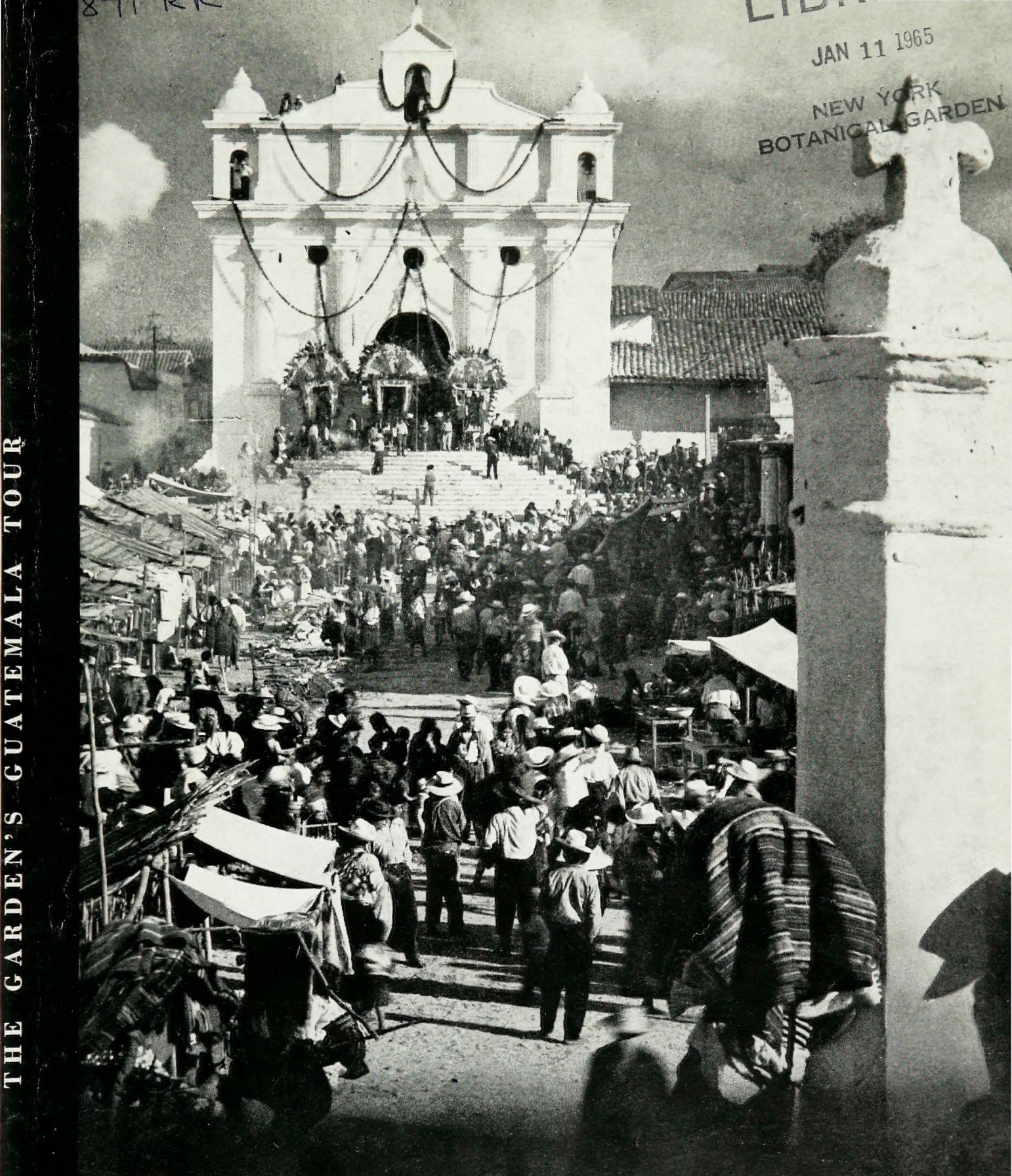

THE GARDEN'S GUATEMALA TOUR

THE GARDEN JOURNAL

THE NEW YORK BOTANICAL GARDEN

Vol. 15, No. 1 January-February, 1965

THE NEW YORK BOTANICAL GARDEN

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THE GARDEN JOURNAL

DOROTHY EBEL HANSELL, *Editor*

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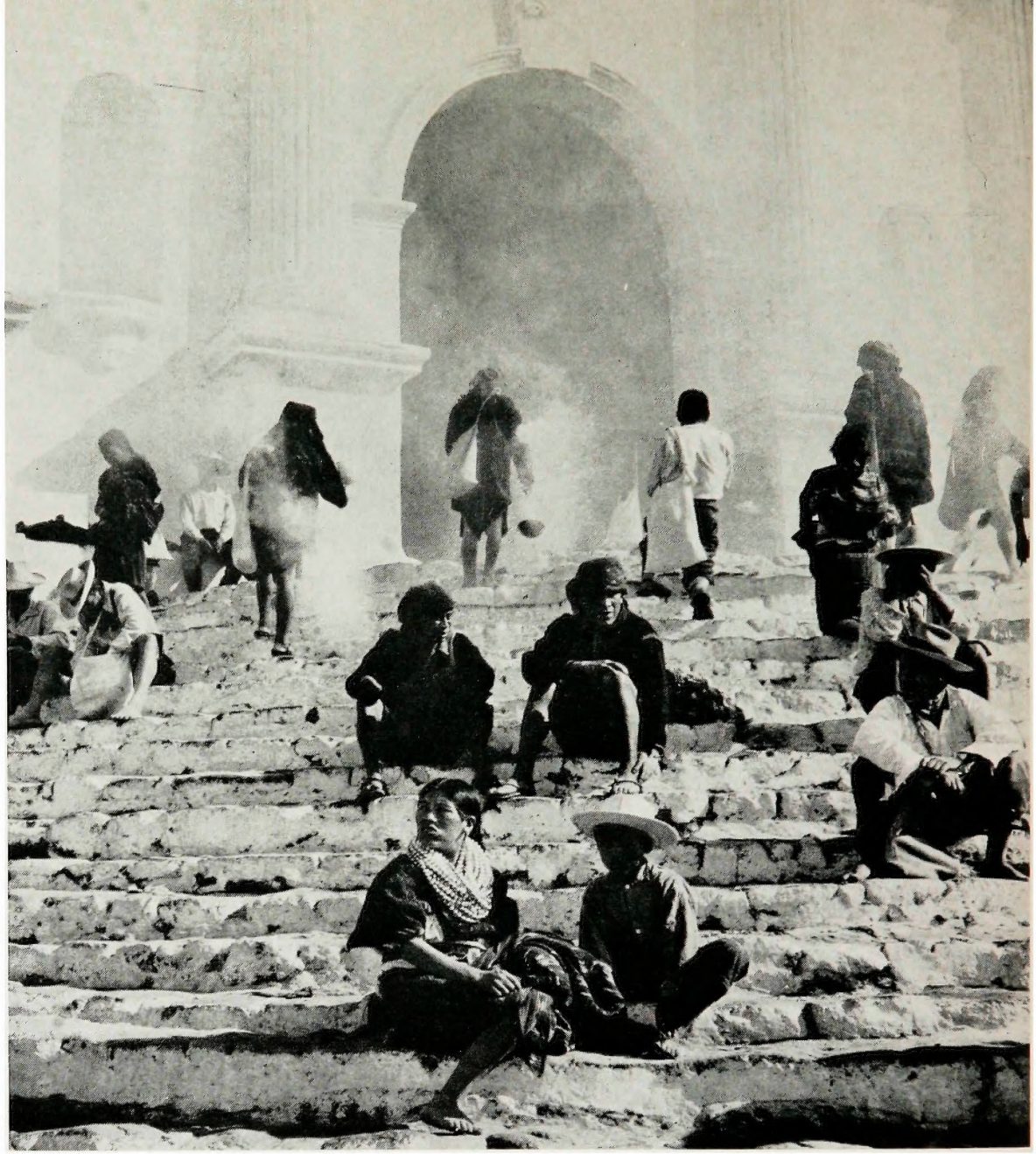


ANOTHER AGE still lives in Guatemala. Here at Chichicastenango, atop a mountain, descendants of the ancient Mayas continue pagan traditions in the Church of Santo Tomas, shown on the cover, with its famous market square where handicrafts are sold from throughout the Central American republic. Incense on the steps of this church (above) is from the juice of the copal *(Bursera)* mixed with pine resins. Festoons on the exterior of the church (see the cover) are made of the long needles of Montezuma pine *(Pinus montezumae)* strung on threads. The black short trousers and head-dresses of the men are embroidered in red.

ARTICLES on Guatemala in this issue of *The Garden Journal* include Botanical Garden President Charles B. Harding's invitation to the Garden's Guatemala Tour, Phil Clark's outline of the tour day by day, Dr. Julian Steyermark's discussion of native plants and climatic zones, and a two-page picture spread in the middle of the magazine. Other articles, forming a study background for the tour, will appear in forthcoming issues.

THE NEW YORK BOTANICAL GARDEN

NEW YORK 58, NEW YORK

January 6, 1965

Dear Members:

This is the advance notice of a very special event we are planning for October, 1965. The Advisory Volunteers of The New York Botanical Garden will join the Garden in sponsoring a fifteen-day visit to Guatemala.

This will be no ordinary sight-seeing trip but one which will combine the best of botanical learning and the local arts and handcrafts. It will be a wonderful holiday in a country which many believe has the most varied and colorful flora in the world. Under the auspices of the Garden, you will be able to visit outstanding estates and private homes, public gardens and institutions, and scenic areas rarely available to tourists.

We will be accompanied by a team of experts headed by our Director, Dr. William C. Steere, who has had vast experience with plants throughout Central and South America. He will be ably assisted by Dr. Pierre Dansereau, the Garden's Assistant Director for Botany and one of the world's foremost ecologists, and Dr. Wilson Popenoe, the dean of Latin American plant pathologists. Mr. Phil Clark of our own staff, who has widely traveled in Central America, will be the Tour Director.

We think this will be pleasurable and profitable for all of us. The Garden will benefit favorably from its role. You will have many advantages because of the Garden's sponsorship which permits an extraordinary visit, attractively priced.

I hope you will want to join us. Let me know if you are interested, and we'll send you the details as soon as they are available.

Sincerely

Charles B. Harding
President

Lake Atitlán, framed by Phoenix palm and banana, shines brilliant blue amid its volcanoes.

GUATEMALA DAY by DAY

By Phil Clark

Mr. Clark is Assistant to the Director (Public Relations) of The New York Botanical Garden.

GEM-BLUE Lake Atitlán sparkles amid pine-clad volcano peaks, gleaming pink orchids dangle from an oak gray-draped in Spanish moss, Indians in flowered trousers bargain at market in deep-voiced Maya-Quiché, and a shimmering green parrotlet screams among the tree-ferns.

All this is Guatemala, is *still* Guatemala, even as the little Central American republic teeters on the brink of a new age. And it all awaits The New York Botanical Garden's October 22-November 6, 1965 Tour, a tour which will be unique with its botanical guides, including some of the top specialists in the field, as well as its entree to Guatemala's leading private homes, gardens, and plantation estates, visits to tropical agricultural centers, and its informed view, with Guatemalan guides, of the life of the Indians, their handicrafts, markets, and colorful costumes.

A few of the highlights, taken from my notebook that was written during a preliminary trip and projected into next fall's tour dates, will give you a picture of what your Guatemalan vacation promises.

FRIDAY, OCTOBER 22. You meet most of the tour's botanical and horticultural experts—one to every twenty people—at Kennedy International Airport. The tour specialists include such men as Dr. William C. Steere, the Garden's Director and a veteran of many tropical American expeditions, and Dr. Pierre Dansereau, the Garden's Assistant Director (Botany), and a world-famous ecologist. After a six-hour jet flight, you arrive in Guatemala City and have a cup of Guatemala's famous coffee, while tour officers handle custom's details. Your hotel, reached via an avenue lined with the "African tulip tree" *(Spathodea campanulata)* is the Guatemala-Biltmore, a modern Spanish building of comfort and style. Air is bracing at this elevation of forty-nine hundred feet where, as near as it is to the Equator, temperatures are always springlike. You meet the tour's other horticultural specialist at dinner—he is the renowned Guatemala expert, Dr. Wilson Popenoe, an American whose name is a legend in Guatemala where he has spent a good part of his life. You are told that Guatemala does not have the problem of impure water, which causes tourist sickness in so many countries.

SATURDAY, OCTOBER 23. Today's agenda takes you to a garden and a museum which furnish introductions to the tour's twin emphases: plants and people. You see a cross section of the national culture, past and present, in the Archaeology and History Museum in Aurora Park, with its carefully staged stone artifacts from the Mayan pyramids and archaeological zones of Guatemala. Here the colorful regional dress of the Indians of the various sections of the Republic is displayed. Equally interesting is the visit to the fabulous plant-collection garden of Don Mariano Pacheco Herrarte, an impressively active octogenarian and his country's most notable plantsman and botanical collector. He may himself escort the group through the garden which is particularly distinguished for the native Guatemalan plants, especially the many indigenous orchids. Here you see your first *Monja Blanca,* or White Nun orchid *(Lycaste skinneri alba),* the dazzling national flower. The garden as a whole gives you a living sketch of the fantastically varied plant life Guatemala possesses in her tropical lowlands and temperate highlands.

SUNDAY, OCTOBER 24. After church or late breakfast and a swim in the hotel pool, you lunch, then visit the town house of one of the Republic's leading coffee-finca owners. Doña Julia de Plocharski, with a rare sense of design, has

Speaking Cakchiquel, these two men of Sololá rest on a park bench during market day. Their gray-striped jackets are embroidered with stylized bats—since they are of the Clan of the Bats; their skirts are black, brown, and white check and the trousers striped red, white, and blue, and other colors.

landscaped her own outstandingly beautiful garden; it contains many unusual shrubs and flowering plants, from both temperate and subtropical climes. You also visit Minerva Park, high above the city, to see the relief map of Guatemala—a great help in orienting you for the coming trip. It was made in concrete in 1905 and shows all the mountains, rivers, forests, coasts, and towns of Guatemala.

MONDAY, OCTOBER 25. You're off, riding comfortably by car and accompanied by an English-speaking Guatemalan driver-guide and three companions from the tour. Moving seventy-four miles northwest, mostly through mountains, you are surprised by the combination of what seems to be tropical flowering plants and pine forests. The botanists explain, during one of the roadside plant stops, that these are not tropical but warm-temperate plants, many of which are familiar to you as house plants at home. Suddenly you sit up in amazement. Just ahead, cradled in a circle of cloud-shrouded volcanoes, lies shimmering Lake Atitlán. Another thrill moments later—groups of fifteen-foot tree dahlias, crowned by masses of giant, yellow-centered, pink blooms, with the lake and drooping-needle Montezuma pines for a backdrop. You reach your hotel, Casa Contenta on the lake, and there's time to freshen up before lunch. You have a small cottage to yourself, set in a flamboyantly flowering garden. The lake climate causes many plants to produce immense blossoms; geraniums and begonias with huge flowers serve as foundation plants in front of the cottage, and walls are atumble with blazing purple and red bougainvilleas, red-orange flame vine *(Pyrostegia ignea),* blue trumpet *(Thunbergia laurifolia),* and Easter-lily vine or heralds-trumpet *(Beaumontia grandiflora).* Lunch is in a dining hall which is richly dignified with heavily carved mahogany beams, doors, and furnishings. A waitress wearing shadow-weave *huipile* and head-dress serves the meal, using mahogany serving plates. After roaming around the garden-grounds and the Cakchiquel-speaking village of Panajachel, you take a cooling swim in the lake.

Cost of the fifteen-day tour, including all expenses both air and ground and a $400 tax-exempt donation to The New York Botanical Garden, will total $1198. For further information about the itinerary and prices, or application for tour membership, write: The Garden's Guatemala Tour, The New York Botanical Garden, Bronx, New York, 10458.

TUESDAY, OCTOBER 26. You visit the market town of Solalá, high above Lake Atitlán. The men of the village wear gray woolen coats, with stylized black bats embroidered on the back, and brown and white plaid skirts over blue, pink, and white-striped trousers. Women wear blue, white, and red headpieces, wide sashes and blue skirts. The people, like the natives of Panajachel, speak the Cakchiquel language. After lunch at Casa Contenta, you join the botanists for a hike up the road from the lake, marveling at views of the lake from higher elevations, investigating the roadside flora which includes a magnificent shining violet shrub salvia, and photographing the falls which, alternately frothing and crystalline, tumble hundreds of feet down the mountainside into the lake.

WEDNESDAY, OCTOBER 27. You take a launch across Lake Atitlán to the town of Santiago Atitlán, a village of Tzutuhil-speaking Indians. The women wear bright red, tightly wrapped skirts, white *huipiles,* and "halo" head-dresses made by wrapping ribbon around the head; the men wear white shirts, red sashes, and short, white trousers embroidered with butterfly-like figures.

THURSDAY, OCTOBER 28. Today is market day at Chichicastenango, seventeen miles in the mountains to the north. Joining your driver-guide and traveling companions, you begin the exciting ride past the falls and, ever twining upwards, through increasingly dense forests of pines and oaks, branches of which are loaded with bromeliads, many displaying their strange red or yellow flower-stalks. You stop at one point to examine along the roadside a blazing magenta butterwort (*Pinguicula* sp.) which resembles the Af-

Textiles, made on hand- or foot-loom, are among Guatemala's most important products and are widely sold in markets.

Garden of the Papal Nuncio to Guatemala is landscaped in the Spanish tradition with flowering and foliage plants along the paths. Norfolk-Island-pine *(Araucaria excelsa)* dominates the central court, gardenia and night-flowering, willow-leaved jessamine *(Cestrum parqui)* perfume the colorful garden. It will be one of many open to the Tour.

rican violet. The botanists tell you the leaves are used to turn milk sour and that in a few weeks the leaves will have folded like an accordion into stemless succulent rosettes for the dry season—an observation which makes you realize why these late October, early November weeks were selected for the tour: the inconvenience of the rainy season is just past, but the countryside is still flowering and green.

At noon you reach the mountain top, to be confronted with a bustling market, in which fabric, pottery, woven palm, carved wood, masks, silverware, and stone idols are sold, and a bizarre religious center. Here the Maya-Quiché continue the pagan rites of their ancestors in a Catholic church. The sights on the steps and within Santo Tomas Church are unbelievable—clouds of black *pom* smoke rising heavenward from the stairs, the church alight with gleaming candles to which the squatting Indians chant ancient Maya-Quiché prayers while sprinkling flower petals on the floor. The men wear black shorts and vests embroidered in red. Lunch is at the charming Mayaland Hotel, with music from a marimba orchestra. You return to Casa Contenta for dinner.

FRIDAY, OCTOBER 29. You start early for Quetzaltenango, fifty-five miles to the north, with a stop at the mountain-top market of San Francisco el Alto. Here woolen rugs and blankets, loomed in the area, are the specialty. On the way, you gasp with surprise at the intricate terracing of whole mountains for grazing of black sheep and for raising wheat and corn. Guatemala's "Scotsmen" shepherds startle you, too, wearing brown and black woolen "kilts" in the cold mountain air. Quetzaltenango, now Guatemala's second city and an important industrial center, particularly for the making of woolen fabrics (you can buy materials for suits or coats), nonetheless retains its Spanish Colonial flavor. It was founded in 1524 by the Spanish conqueror of Guatemala, Don Pedro de Alvarado. Our hotel for the night, the Bonifaz, though of recent construction, is in the Spanish

Below. Time played a trick to create this error in chronology—the lawn mower and its handsome Cakchiquel operator who, like most of Guatemala's Indian peoples, has an intimate feeling for nature, plants, and the soil. Behind, bottlebrush tree *(Callistemon guidingi)* with red stamen brushes is in Casa Contenta garden at Lake Atitlán. Right. Calla-lilies are carried by Lake Atitlán Indian up the steep road to the Chichicastenango market. The shirt is in reds, purples, and greens, and the jacket and skirt mark this man as a resident of Sololá. Flowers play important roles in the social and religious lives of Guatemala's Indian peoples, special kinds used for various events.

Revival style, and its baronial barroom has the mood of an hacienda house in old Mexico.

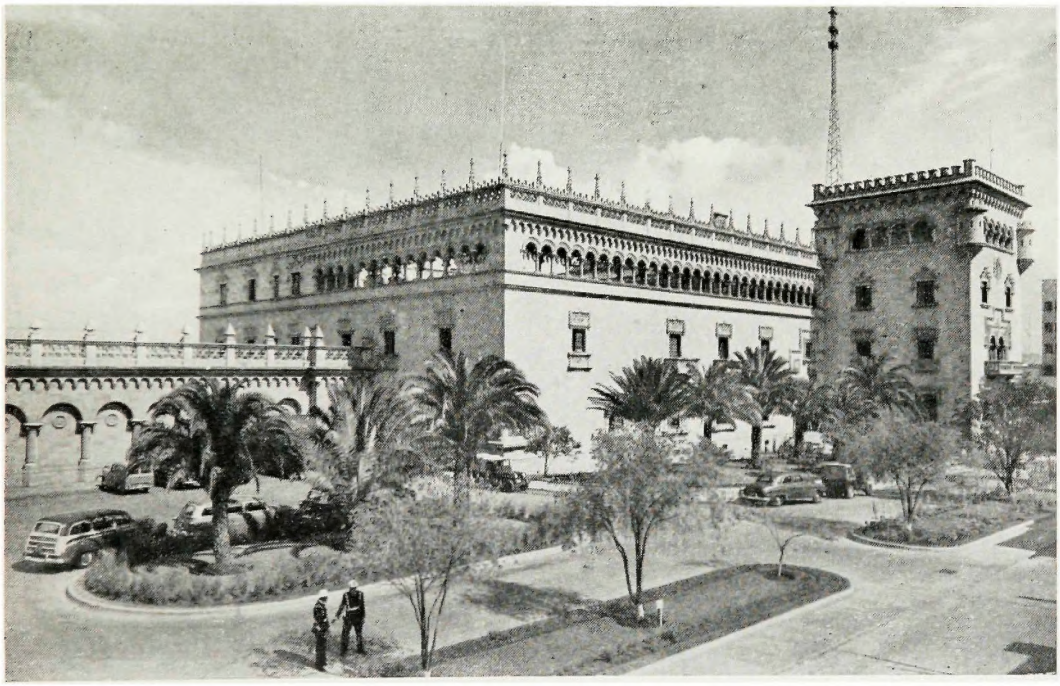
SATURDAY, OCTOBER 30. Today's trip south and east to Antigua takes you along the lowland highway through exciting tropical jungles. You stop several times to admire the flora—red powder-puff caliandra, green plumes of tree-ferns, purple sobralia, orange-colored epidendrum orchids, giant-leaved philodendrons, and wild ginger and bamboo crowded along rushing streams. You stop to investigate a plantation where black pepper, rubber, cacao (source of chocolate), and vanilla orchids are grown. You pass banana plantations and fields of the fragrant grasses from which citronella and lemon tea are produced. Lunch at noon is in "Santiaguito's" near Cocales, where an excellent meal is served in an amazing palm-frond woven oasis of modernity in the primitive tropics. You arrive during the afternoon at Antigua, once again in the cooler altitudes. Today's trip, the longest day's driving on the tour, was one hundred and thirty miles, mostly tropical. You welcome the comfort of your room in swank Hotel Antigua and, after freshening up, take a dip in the pool.

SUNDAY, OCTOBER 31. You attend Mass in one of the tastefully reconstructed Spanish Colonial churches in this city of handsome ruins. Antigua was almost from its founding in 1543, one of the great centers of the New World, with universities, opera, and high society, when nothing but primitive frontier settlements existed north of Mexico. Until its destruction by volcano and earthquake in 1773, it was the capital of Central America and the Spanish conquerors and their Indian subjects lavished some of their finest artistic efforts on its creation. Much of this grandeur remains, somehow; for many, given additional grace by the time-softened ruins. Charm is added the ruins by their settings, often of massed wild poinsettias. You will be shown around the city and will visit private gardens, including the famous Spanish Colonial house and garden of our tour expert, Dr. Popenoe, who has lived in Antigua for many years. You shop directly from the Indian handicraftsmen, mostly personal friends of Dr. Popenoe, at their looms in Antigua and in nearby Santiago Sacatepéquez, where the famous Guatemalan dolls are made.

MONDAY, NOVEMBER 1. You rise early for an all-day outing to three neighboring coffee-fincas (or estates)—all startlingly horticultural as well as interesting agriculturally. The *Finca El Zapote*, in the tropics near Escuintla, for example, has sixty acres of lawns and five artificial lakes stocked with fish and planted with water-lilies. At the *Finca La Profidencia,* owned by one of the world's outstanding orchidists, Hugh Craggs, you see rolling lawns set off by plantings of exotic jungle natives and greenhouses filled with rare Central-American orchids and bromeliads and the hybrids Mr. Cragg has created. The growing and drying of coffee is also demonstrated. The third finca, that of San Martir, owned by Impresa Electrica, was landscaped by the Garden Club of Guatemala. Roadside plants on the side of the volcano El Agua include blue *Achimenes longiflora* and a fiery orange dahlia named for Dr. Popenoe.

TUESDAY, NOVEMBER 2. Today is All Soul's Day, or Day of the Dead, and colorful observances with use of the marigold add interest to the twenty-five-mile trip into Guatemala City, where we return to the Hotel Guatemala-Biltmore. You view the gardens of Guatemala City's main square, touring the National Palace and Metropolitan Cathedral, and shop in the central market during the afternoon.

WEDNESDAY, NOVEMBER 3. Those taking the two-day Tikal side-trip leave early for the airport and the two-hour flight to Tikal. There in rain forest they explore the ruins of this largest Mayan city of the old Empire, first discovered in 1848 and in recent years uncovered and partly reassembled by University of Pennsylvania archaeologists. The city, probably mainly a religious and ceremonial center, flourished as early as 320 A.D. Activity mysteriously ceased and the city was apparently abandoned about 869 A.D., with its magnificent painted stelae, pyramids, and palaces



Gardens around the green stone National Palace on the central square in Guatemala City are in the formal Spanish style, with collections of exotic plants on display in patterned beds. Phoenix palms and cercidium trees are shown above.

left to the jungle, where amid the monkeys and exotic birds it moldered until recent times. Botanists accompany the tour group and guide them through the rain forests, much as the archaeological guides lead them in exploration of the ruins. Simple but adequate accommodations and meals are supplied at "Jungle Lodge."

You visit the exclusive La Canada development with its contemporary landscaping, along the great ravines south of the City, and stop at several private homes and gardens in the area. During the afternoon, you visit other of the city's fascinating historical and architectural landmarks.

THURSDAY, NOVEMBER 4. During the morning, you view several gardens in the embassy residential neighborhood, including that of the United States Ambassador. During the afternoon, you are free for shopping in the downtown area. The tour is rejoined this afternoon by the Tikal expedition group.

FRIDAY, NOVEMBER 5. During the day, you visit gardens on the outskirts of and in the city itself.

SATURDAY, NOVEMBER 6. You fly home.

GUATEMALA
A BOTANICAL PARADISE

By Julian A. Steyermark

Dr. Steyermark, a specialist on *Rubiaceae,* is a member of the staff of the Instituto Botánico of Caracas, Venezuela. He is an authority on the Flora of Guatemala and a coauthor with P. C. Standley of *The Flora of Guatemala,* eight volumes of which have been published. Dr. Steyermark collected plants throughout Guatemala on two major expeditions related to work on this Flora. He has also written for scientific and popular publications and is author of several books, the latest *Flora of Missouri* (1963).

GUATEMALA, land of the quetzal bird, is a botanical paradise. Whoever visits this Latin American country, finds a land admirably suited to plant adventurer and plant fancier alike. Guatemala has just about anything to satisfy everyone, not only for the experienced botanist and horticulturist, but also for the plain gardener and plant lover.

Guatemala is able to satisfy every taste because of its tremendous diversity of landscape, climate, altitude, and soils. Here are mountains and volcanoes by the score, picturesque alpine-like lakes and meadows, cool temperate oak and pine, fir, or cupressus forests contrasting with giant tropical liana-hung trees of rain forest and moisture-laden, moss-festooned cloud forests, while hot deserts and steaming jungles contrast with cold, windswept summits of volcanoes and high mountains. Here are topographic features ranging from steep canyons, caves, everglade-like country, sulfur fumaroles and springs, waterfalls, clear spring-fed mountain streams to dark brown waters of lowland areas.

Here is a land where north meets south, where such familiar northern trees as fir *(Abies),* juniper *(Juniperus),* bald cypress *(Taxodium),* hop hornbeam *(Ostrya),* American hornbeam *(Carpinus),* sweet gum *(Liquidambar),* and box-elder *(Acer negundo)* are found at their southernmost known limits of geographical distribution, while such South American genera as *Greigia, Crumenaria,* and *Aphanactis* and such species as *Plantago tubulosa* and *Werneria nubigena* attain their northernmost outposts. Here in Guatemala the familiar partridge-berry *(Mitchella repens)* has found an isolated refuge in a remote cloud forest of the Sierra de Las Minas at its southern known limit. Other familiar eastern and southern United States plants, such as supple-jack *(Berchemia scandens),* Virginia creeper *(Par-*

Talouma mexicana, a member of the Magnolia Family, is to be seen in Guatemala. From Helen O'Gorman: *Mexican Flowering Trees and Plants.*

thenocissus quinquefolia), and Carolina yellow jessamine *(Gelsemium sempervirens),* are at their southern points of range. Travelers familiar with western plants will find in Guatemala such genera of the Rocky Mountains as *Calochortus, Cupressus,* wallflower *(Erysimum),* cinquefoil *(Potentilla),* lupine *(Lupinus), Arbutus,* paintbrush *(Castilleja),* beard-tongue *(Penstemon),* and snowberry *(Symphoricarpos).* Here the enchanting rain forests of the Rio Dulce harbor a rich variety of tropical vegetation similar to many South American forests, while in the north mahogany and chicle forests hold supreme with a wealth of tropical flora.

Thus from a land so diversified—in altitude, ranging from sea level to nearly fourteen thousand feet on the top of Tajumulco Volcano; in climate, with rainfall from six to two hundred inches annually and temperatures from as much as 100° F. in the Motagua Desert to as little as 16° F. on the higher mountains; in soils derived from rocks varying from sedimentary (limestone, shale, and sandstone), metamorphic (marble, serpentine, gneiss, and mica-schists), to igneous (granite, diorite, basalt, pumice, and volcanic ash); and in topographic conditions embracing plateaus, volcanoes, mountain slopes, lakes, valleys, and plains, emerges a kaleidoscope of infinite plant variety and contrast. Guatemala harbors within its confines geologically ancient terrain, since a part of the old nuclear core of Central America, untouched by glaciation and not covered by marine waters since remote times, is preserved along an east-west mountain axis extending from the Sierra de Las Minas to the Sierra de Los Cuchumatanes. In this area, available for plant settlement and occupation since late Cretaceous times, are found unusual kinds of trees, shrubs, vines, and herbaceous plants of great rarity and interest.

With such a rich background to draw upon, let us take a brief survey of some of the plant treasures of this land of nearly ten thousand different botanical species in the expectation of encountering some of them on a projected visit there.

FLOWERING TREES, SHRUBS, AND VINES. With the greater part of Guatemala covered by heavy forest, it is not to be wondered that this country boasts a large number of unusually beautiful and attractive trees, shrubs, and vines. One of the truly sensational trees to see in flower is the *Guacamayo* or *Flor de Mico (Phyllocarpus septentrionalis)* of the Legume Family, found only along river canyons of a dry section of eastern Guatemala. When in flower, during January and February, it is leafless and the branches are covered with thousands of coral-red blossoms. Another gorgeous red-flowered tree is the *Canté (Bernoullia flammea)* of the Bombax or Kapok Family. Striking members of the Magnolia Family are represented by *Magnolia guatemalensis* and *Talauma mexicana* with large, white, fragrant flowers; the closely related winter's bark tree *(Drimys)* with showy bunches of white flowers is found in mountain forests of the Sierra de las Minas and Sierra de Los Cuchumatanes.

Many species of evergreen oaks are encountered, especially in the mountains and at medium and higher altitudes, often associated with several kinds of pines. Beautiful yew trees *(Taxus globosa),* up to sixty feet tall, cast their shade in the moist mountain forests of the Sierra de Las Minas and Sierra de Los Cuchumatanes; on the middle and upper slopes of volcanoes occurs the strange *Mano de León* or

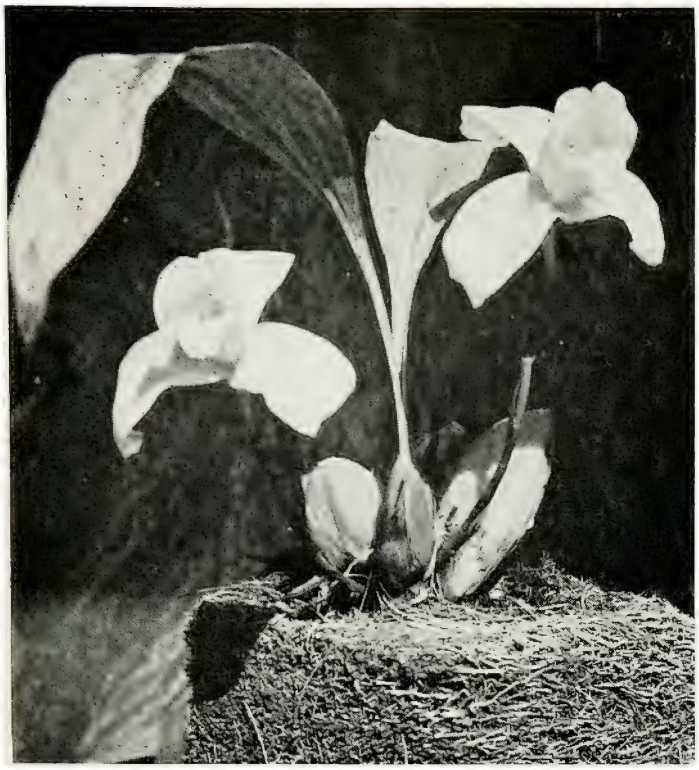
Tabebuia pallida, a bignoniad, is native to the West Indies, Central and northern South America. From Helen O'Gorman: *Mexican Flowering Trees and Plants.*

hand-flower tree *(Chiranthodendron pentadactylon),* whose scarlet, peculiarly branched, staminal column protruding from the large flowers presents a hand-and-finger-like appearance.

A wealth of small palm species belonging to the genus *Chamaedorea* awaits the plant lover who ventures into the mountain forests. Some of these, such as *C. elegans* and *C. pachecoana,* the latter the smallest of Guatemalan palms and less than a foot tall, are extremely attractive.

Although no wild rhododendron is found in Guatemala, a close relative, *Befaria,* of the same family, with showy white flower sprays, appears infrequently in the forests. Many attractive shrubs of the Heather Family, such as madroño *(Arbutus menziesii),* with coppery brick bark and sprays of creamy white, bell-shaped flowers, are commonly encountered.

Among the ornamental vines several of exceptional beauty should be mentioned, including the large trumpet-shaped *Tintinnabularia* with cream-colored, spotted flowers; *Solandra* with huge yellow and purple-spotted, trumpet-shaped flowers; and a climbing hydrangea *(H. steyermarkii),* which ascends the trees in mountain forests. Everywhere you travel in Guatemala, you are impressed with the numerous vining species of the Morning-Glory Family *(Convolvulaceae),* especially members of the genera *Ipomoea* and *Merremia* with attractive flowers ranging through the gamut of blue, purple, rose, red, yellow, and white. Numerous other vines with eye-catching flowers, belonging to the Passion-flower Family *(Passifloraceae),* Dogbane Family *(Apocynaceae),* Milkweed Family *(Asclepiadaceae),* and Catalpa Family *(Bignoniaceae),* are predominant in the Guatemalan landscape. In fact, all around the towns and cities, homes from the simplest *ranchitos* to the most exclusive estates are bedecked with colorful vines.



Monja Blanca or White Nun orchid, *Lycaste skinneri alba,* is the national flower of Guatemala. There is a form with pink petals and white sepals, and an all pink form.

Monstera deliciosa, native to some Guatemalan forests, here shows both flower and fruit. The fruit, known as ceriman, is edible and delicious.

BULBS. Some remarkably beautiful bulbous plants attract the attention of those visiting Guatemala. Among them may be mentioned the tiger or ocelot flower *(Tigridia pavonia),* a member of the Iris Family, whose large crimson and yellow flowers with red spots adorn the oak forests or appear spontaneously in cultivated corn fields and open slopes. Other members of the same family, such as *Trimezia,* with yellow and orange, purple-spotted flowers, lavender and white *Cypsella,* blue, violet, or white *Nemastylis,* and blood-red and yellow *Rigidella,* brighten mountain meadows, valleys, and slopes.

Although not a true bulb, the tree dahlia, with tuberous thickened roots, should be mentioned here. It is frequently found at cooler and more temperate sites around native huts and in thickets and margins of cloud forests. It at once attracts notice with its lavender, rose, or white flowers towering on woody stems ten to fifteen feet high. Double as well as single varieties are found.

COLORFUL ANNUALS AND PERENNIALS. There is no end to the number and variety of showy-flowered annuals and perennials to be found in Guatemala. In the high mountain and alpine-like meadows of the Sierra de Los Cuchumatanes, as well as on the volcano summits, are beautiful red-and-yellow paintbrushes *(Castilleja),* blue-and-white lupines *(Lupinus),* blue and lavender *Geranium alpicola* and gentian *(Gentiana),* white-petaled, glossy-leaved *Weldenia candida,* yellow daisy-like *Aplopappus stolonifera,* and *Helenium integrifolium,* the latter with large heads of flowers surmounting smooth, green, leafy stems. Attractive rock-garden and mountain-meadow plants forming dense carpets or cushions of leaves are represented by the lovely white-flowered *Houstonia serpyllacea,* reminding us of some of our northern bluets, and *Arenaria bryoides* var. *guatemalensis* of the Pink Family *(Caryophyllaceae).* Attractive *Heliconia* with bright red, orange, or yellow flower-spathes subtending yellow and blue-green-tipped flowers, handsomely colored-leaved *Calathea,* and red-, yellow-, or white-flowered *Costus* are commonly met in the warmer climes of the country.

Marigold *(Tagetes),* cosmos, dahlia *(D. coccinea),* and red-and-yellow *Lopezia* are among some of the attractive annuals.

ORCHIDS, BROMELIADS, PHILODENDRONS, AND TREE DWELLERS. Orchids and bromeliads, of course, offer a rich variety of species to the Guatemalan traveler. The rare, white-flowered form of *Lycaste skinneri,* the *Monja Blanca,* or White Nun orchid, is the national flower of Guatemala. There are orchids of all colors and descriptions among the nearly six hundred species native to the country. The showy, orange-flowered *Cattleya aurantiaca* and the large, lemon-yellow and olive-green-flowered *Lycaste cruenta* adorn crotches of trees in the oak-pine forests, while stands of the spectacular yellow-and-white-flowered native lady-slipper *(Cypripedium irapeanum)* send up stems, two to three feet high, in open ground. Another lady-slipper, almost extinct, is *Phragmopedilum caudatum,* its two lateral petals sometimes reaching an unbelievable length of nearly two feet. Brilliantly flowered species of *Stanhopea, Gongora, Mormodes, Laelia, Oncidium,* and *Odontoglossum,* in all colors and hues, brighten the Guatemalan scene; the last-mentioned genus is often predominant on the higher slopes of the volcanoes.

Many attractive-leaved species of *Philodendron* and other aroids are everywhere manifest. The high-climbing *Philodendron radiatum* with giant, dissected leaves is a common species in the warmer rain forests, and the ornamental "Swiss-cheese" or "Ceriman" plant *(Monstera deliciosa)* is native to some sections of the Guatemalan forests.

Above. Tree-ferns abound on the middle and upper elevations of mountains and on slopes of volcanoes. *Cibotium schiedei,* seen here, is a native tree-fern of Guatemala.

Lower right. The large flowers of the tree dahlia, on stems to fifteen feet in height, attract attention both around native huts and on margins of cloud forests.

Below. *Tigridia pavonia* adorns oak forests and appears also on open slopes and cultivated cornfields in Guatemala.

So many beautiful tree-dwelling plants or epiphytes are to be seen that it is difficult to select one from another for mention. Some of the most beautiful are found in the moist mountain forests, especially such colorful gesneriads as *Columnea crassifolia.* Delicate filmy ferns and other kinds in great variety, *Peperomia,* climbing *Begonia scandens* with glossy green leaves, and bromeliads are among the more common types encountered. Among the many bromeliads, one is especially noteworthy, *Tillandsia standleyi,* particularly because of its pendent inflorescence (three to five feet long) of rose-red bracts surrounding bright purple flower-clusters. It is a tree dweller in oak-pine forests.

MOSSES, FERNS, AND PRIMITIVE PLANTS. To behold the majestic trunk of a tree-fern crowned by a plumelike fountain of feathery green, lacy fronds in its natural setting of a dense forest, is a joyous sight indeed, and such sights may be had in many parts of Guatemala, where the tree-ferns abound by the thousands and are common on the slopes of the volcanoes and at middle and upper elevations of mountain forests. They are represented by numerous species, and their delicate beauty enhances the general landscape.

In the cloud forests especially, the branches of trees are festooned with dramatically hanging masses of liverworts and mosses, whose graceful tangles of greens and browns produce a fairyland appearance amidst the other wealth of plant life there present. Mosses are also conspicuous everywhere else in Guatemala, often covering large patches of ground in forest terrain, as well as occupying diverse habitats throughout the country, in great variety. *Sphagnum* is represented in Guatemala by several species.

Primitive cycad plants belonging to the genera *Zamia* and *Ceratozamia* are encountered in various parts of Guatemala, especially along the east-west running mountains, and the stiff, divided, dark green rosettes of leaves, which crown

(Continued on page 23)

AMERICA'S STEWARDSHIP OF ITS SPACE AND RESOURCES

Remarks by Secretary of the Interior Stewart L. Udall at the Forum sponsored by the Garden Club of America, Hotel Pierre, New York City, November 17, 1964.

I am here today to talk to you about the winning of the East. It's a frontier, cliff-hanger kind of story . . . What I am proposing is that our newest, most challenging frontier instead of existing somewhere in a mythological West, is right here in eastern backyards.

If there is a banner around which the members of America's garden clubs can rally, it is the banner with the insignia of the out-of-doors. Nowhere is outdoor quality in more demand or greater than on the eastern seaboard.

Conservation, as you may have gathered, is my favorite subject. I have even been accused of inventing it, but I didn't. The word carries a tremendous conceptual load, and the concept has changed radically from time to time—what I want to put before you today is the proposition that conservation is no longer a term for scholarly comment and possibly debate, but rather a cause which should enlist our most strenuous efforts.

A recent issue of a sports magazine contains a righteous polemic on behalf of an America the author fears is lost forever. He bemoans the end of our natural glory and entitles his tirade, "Down the Drain." I was asked to comment on the piece and in my commentary I pointed out that sporadic outbursts of rage may serve a useful purpose, but that much more could be accomplished by a consistent, day-to-day effort to improve our total environment.

There is no better place to begin than here; no better time than now.

This is a nation generously endowed with outdoor space. It is also a nation of people. Unfortunately, the space is too often where the people aren't. President Kennedy used to say to me, often, that the West has "all those wonderful parks" but that he felt an overwhelming need for parks here in the East . . . where the people are. "Let's do something where the people are," is what he said to me again and again, and this is the impetus which resulted in Cape Cod and Fire Island national seashores.

Recently, at the dedication ceremonies for Fire Island National Seashore, *I* was honored. They needed someone to "hang" the ceremonial on, and I was a convenient rack. But actually, it was *their* day of triumph. As I said there: "I have never known a time in this country when a real conservation decision came to a head and so many people came up on the right side."

And so I come to you today with the appeal which springs naturally from your geographical position and your professed inclinations.

You are people who love the earth. Your love is a deeply felt, personally important fact of your life. I am asking you, today, to enlist this emotion in a cause which rates as high as any I know—the cause of quality. I happen to disagree with some of what the aforementioned editor said in his diatribe against America's "stewardship," but if my defense of our people is to be justified, then *you* people, and many more just like you, must come through for such causes as the Fire Island National Seashore. You must make your voices heard—your sinew felt.

There *are* causes worthy of your best effort. As the poet, Robert Frost, wrote: "The woods are lovely, dark and deep. But I have promises to keep, and miles to go before I sleep." He knew whereof he spoke. We not only have miles to go before we sleep, we can *never* sleep. This is a homespun constant in a ceaselessly changing world. For as the Red Queen observed, in *Alice Through the Looking Glass,* one must run as fast as one can merely to stand still. In the Lewis Carroll case, the countryside was accelerating like a monstrous treadmill. Much the same might be said today. Without benefit of Lewis Carroll, our countryside is disappearing as fast as the nightmare fiction dreamed up by Carroll's fertile imagination. And it is up to us—not the Red Queen—to do something about it.

And so you ask me, "What's to do?" Well, there is a very specific answer to that, and I am delighted to be able to share it with you.

First, and again, right in your own yard—the Fire Island matter is not yet settled. We cannot merely tack another skin to the wall and call it a trophy. There are skirmishes yet to be fought. The National Park Service, which will be administering the new national seashore, may have to get tough with some modern-day pirates—people who would like to take the establishment of this public facility as a signal to fill their private pockets. Their moves only underline the last-chance nature of this particular seashore.

There exists on Fire Island—or there *did* exist—an eight-mile stretch of wild, unpopulated land, intended as the prime "natural preservation area" of the new national seashore. No sooner had the seashore become a certainty than construction began on new beach homes in the very area most prized for its untouched condition. Obviously, the action involving Fire Island came not a moment too soon. The Park Service has given notice that developers may negotiate with the Government at fair market value or face condemnation proceedings.

But Cape Cod and Fire Island are not the end of the eastern story. And the necessity for informed, militant citizen action is growing as the opportunities shrink. Only this week a proposal was offered to set aside 763 acres along a seven-and-a-half-mile stretch of the Hackensack River in central Bergen County, New Jersey, to be used as a recreation and conservation area.

When I pick up a newspaper and read this kind of thing, I can almost set it to music. The words "recreation" and "conservation" are that important to me. They should be to you, too. And you are as necessary to the success of any such venture as the songwriter is to a hit tune. Because these days it takes an alert, informed, and, more than anything else, an *aroused* citizenry to bring our few remaining eastern opportunities to reality.

One recent and notable success was the Great Swamp

project in New Jersey. This was one of the lost causes that got "un-lost"—mostly because a determined group of citizens decided to make this cause their own. The Fire Island story is another bitter battle which came out with a happy ending simply because a lot of determined people decided to write the ending the way they thought it should be written.

Cape Cod was another "tough sell." There were folks up there who were ready to bring out their shotguns and send us back to Washington. Today they have joined the Cape Hatteras enthusiasts in loving the Park Service.

I am dwelling on happy endings because we have a few of which we can be justly proud. But there are some unfinished stories here in the East, and whether they end in the plus or minus column is largely up to you. One of them is the story of Maine and the Allagash. Here, within reasonable travel distance of the nation's most populous areas, lies a true recreational gem.

The Allagash has recreation possibilities so unique they constitute a primary consideration in plans to develop and harness the St. John River and the Passamaquoddy tides. What is at stake, moreover, is a matter of concern not just to Mainelanders. It involves the entire nation, but most particularly the eastern megalopolis. It will take earnest, informed action on the part of people like you to save this prime recreation area for today's and future Americans.

Recently, the talented photographer, Ansel Adams, exhibited some of his work in the Department of the Interior's art gallery. There were outstanding shots of breathtaking views, but I recall with especial clarity some of the photographs of superficially prosaic subjects, such as a flower or a leaf gleaming in the sunlight. I mention this primarily to illustrate the fact that "selling" conservation is as simple as "selling" a beautiful photograph of a national park. The secret lies in making the whole thing personal—"involving" people. As Mr. Adams said, "You can look at a picture of the Grand Canyon, or stand in person in front of Yosemite's El Capitan, but you simply cannot 'take it in.' The things that really get through to you are such things as pine needles with the sun making them all shivery with light—or a trillium pushing its blossom up through a forest floor of dead leaves."

These are the things people understand. These are the things they react to. And when people react, things happen.

So what I am asking you to do is really only this: Help write a happy ending for the unfinished stories still remaining here in the crowded East. At the Federal level, we believe we have provided a framework within which an inspiring picture of "America the Beautiful" could emerge. President Johnson has not only signed into law such important conservation legislation as the Wilderness Bill and the Land and Water Conservation Fund Act, but he has laid down vital principles of stewardship which invite wholehearted citizen support.

President Johnson has called for "a new conservation." He has recognized the triple threat of population, technology, and urbanization, and called for a new look at the total relationship between man and the world around him. "Its object," he has said, "is not just man's welfare, but the dignity of his spirit."

There is a quality to life that can be measured only in terms of the spirit. Women have traditionally been the keepers of this particular flame. Here, where urbanization threatens to ravish the land, there is a special role for garden-oriented women to play.

If the growth of our nation is to be a blessing, not a blight, we have to follow the words of the poet and "grow right." You know about growing things—you know the importance of growing right. You have a tremendously important opportunity to see that we grow right in the crucial years ahead.

As President Johnson has said: "On this earth the ring draws closer around us. Let us have space and resources here in America to fit our children's hopes."

A SQUARE MILE IN NORTH CAROLINA

By George A. Elbert

Mr. Elbert and Mrs. Elbert are enthusiastic amateur botanists. A number of their photographs have been selected by Dr. H. W. Rickett, Senior Curator of Botany, for the five-volume series on the Wild Flowers of the United States. Mr. and Mrs. Elbert have given illustrated lectures on "How and Where to Find Wild Flowers" and "Exotic Plants of Florida" in the Saturday Afternoon Programs at the Garden.

REGARDING the geographical distribution of wild flower species, it would be reasonable to assume that they occur more or less regularly in relatively fertile and unmolested areas. The regularity of which I speak would be a heavy predominance of individual species, according to the ecological needs of each in discrete scattered stations. There would be some congregating of plants which have like requirements, but a certain exclusivity would arise from specialization. Thus in ecologically similar terrain we would expect to find more or less the same few species recurring. The great diversity among species would be served adequately by the great variety of conditions and environments.

If all this were true, the searcher for plant specimens would achieve the most rewarding results by traveling long distances and not concentrating his efforts in any one place. His finds would occur with a certain predictable frequency roughly according to his mileage within a zone.

Our own experience is rather convincingly to the contrary. We have spent a number of years searching out and photographing wild flowers. Of course, the intensity of our study is not to be compared to that of the exploring botan-

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1. Farmer with bullocks and wooden plough. Almagreira (Santa Maria).

2. Very efficient terracing near Santa Barbara with potato cultures (Santa Maria).

ITER AZORICUM

By PIERRE DANSEREAU

Dr. Dansereau is Assistant Director (Botany) of The New York Botanical Garden.

THANKS TO A GRANT from the Conservation Foundation, I was able to organize a small expedition to the Azores from May 17 to July 1, 1964. As I frequently do, I wrote an account of our party's work, play, adventures, and impressions. This diary was not always kept day-by-day, a good deal of it was written somewhat later. May the reader convince himself that hind-sight and editing at press time do not make us seem more knowledgeable or wiser than we were.

The party comprised the following persons: Dr. Antonio R. Pinto da Silva, Chief of the Botany Section at the Estação Agronómica Nacional at Oeiras, Portugal; Mrs. Quitéria Pinto da Silva, Naturalist and Librarian at the same institution; Bento Rainha, a plant collector, also at the same institution; John Milton, Research Associate at the Conservation Foundation, New York. My wife accompanied us, unofficially, although she contributed some drawings of landscapes, buildings, and plants which we propose to use in some of our publications.

Our objectives can be summarized under three headings: flora, vegetation, and land-use.

FLORA. The Azores are at the northwestern end of Macaronesia (the Fortunate Islands), an arc of archipelagoes which also includes the Cabo Verde Islands, the Canaries, and Madeira. The Azores contain many species which are endemics, or are found only in one or more of the other three archipelagoes, and some which are also represented on the European continent. Many of these endemics or near-endemics are known as fossils in Europe where they bear witness to a Tertiary temperate rain forest of the laurel-leaved type. Other Azorean species have their nearest of kin in moist, Atlantic Europe or in the western Mediterranean. The first comprehensive enumeration of Azorean higher plants was made by Seubert in 1844 from the collections of the Hochstetters[1]. This was substantially revised by Watson (1870)[2] and by William Trelease (1897)[3], who mentioned 605 species, including the introduced ones. Expeditions from time to time, mostly British and Portuguese, have added to this number. Also, as knowledge progressed in the rest of Macaronesia and in Europe, many changes in the rank of the units were made, involving both lumping and splitting. A Portuguese botanist born in the Azores, Professor Ruy Telles Palhinha, contributed a great deal to Azorean taxonomy. Just before he died in 1957 in an accident at eight-six years of age, he had completed the manuscript of a new flora which lists 671 species. Dr. Pinto da Silva proposes to publish this manuscript very soon, having brought the nomenclature in line with current usage; as one of the advisors of the *Flora Europaea,* he is an authority

1 Moritz Seubert, 1844. Flora azorica quam ex collectionibus schedisque Hochstetteri patris et filii elaboravit. Bonnae, vi + 50 pp., 15 pl.

2 H. C. Watson, 1870. "Botany of the Azores." IN: Natural History of the Azores, or Western Islands, by F. du C. Godman, pp. 113-288. London.

3 William Trelease, 1897. "Botanical observations on the Azores." Ann. Rept. Missouri Bot. Gard. 8:77-220, pl. 12-66.

on nomenclature. The work will otherwise remain exactly as Palhinha wrote it. Of course, some of the nine hundred specimens which we collected in the present itinerary may turn out to be additions to the flora of the islands. Innumerable extensions of area were also made; for instance, where Palhinha reports a species for one or two islands only, we found it on one or more others. Probably more important, however, will be a personal assessment by Dr. Pinto da Silva and myself of the degree of affinity of certain critical endemics. Are the Azorean laurel, heather, and blueberry truly distinct species or merely sub-species or varieties of the Madeiran and/or Canarian taxa?

VEGETATION. Published information on flora is much more abundant than accounts of vegetation. Most authors (Seubert 1844, Watson 1870, quoted above, Guppy 1914,[4] 1917,[5] Chopard 1931[6]) provide a sketch of altitudinal zonation upon which more recent writers (e.g., Tutin 1953[7]) have not seen fit to improve, even when they have provided some data on the composition of individual plant communities (Marler & Boatman 1952[8]). It remained therefore for Dr. Pinto da Silva (who is a phytosociologist of the Montpellier School, somewhat more orthodox than I am) and for myself to gather more precise data on as many communities as possible. We have both taken a substantial number of relevés (quadrat surveys). We expect to provide a descriptive account and an interpretation of the plant-cover of the Azores which cannot hope to be complete but will set the stage for further investigation. Mrs. Pinto da Silva will analyze the peat samples taken in various places and attempt to reconstruct climatic sequences by pollen analysis.

LAND-USE. A compilation of geological, physiographic, climatic, and pedological data as well as an analysis of the major trends of production and economy of the islands will provide background for an interpretation of our own field observations. More than a thousand photographs taken by Antonio Pinto da Silva, John Milton, and myself, and cor-

3. Disintegrating *socalco* (terrace) in foreground. Santa Barbara in background (Santa Maria). 4. Village of Sao Lourenco bordering sea and dominated by steeply terraced vineyards. Pastures on plateau above (Santa Maria). 5. Surf, village of Sao Lourenco, road and vineyards (Santa Maria). 6. Close view of recently planted vineyards: in each enclosure there are nine plants, a tight pavement between them; narrow lava walls break the sea wind. (Santa Maria.)

4 H. B. Guppy, 1914. "Notes on the native plants of the Azores as illustrated on the slopes of the Mountain of Pico." Bot. Gard. Kew, Bull. Miscel. Inform. 9:305-21.

5 H. B. Guppy, 1917. "The Azores." Chaps. XVII-XIX, pp. 359-440 IN: Plants, Seeds and Currents in the West Indies and Azores; Williams & Norgate, xi + 531 pp. (1 map of Pico and the Azores) London.

6 L. Chopard, 1931. "La végétation des Açores. La flore indigène, la flore introduite et les principales cultures." La Terre et La Vie, N° 1, pp. 27-39.

7 T. G. Tutin, 1953. "The vegetation of the Azores." Journ. Ecol. 41:53-61.

8 P. Marler and D. J. Boatman, 1952. "An analysis of the vegetation of the northern slopes of O Pico, the Azores." Journ. Ecol. 40:143-155.

related with our abundant field notes, will allow us, we hope, to detect some of the emergent land-use patterns. Many incidences of cultural as well as ecological and economic forces have been traced.

* * *

The Azores lie between 36°55′ and 39°43′ Lat. N and between 25° and 31°30′ Long. W. There are nine islands (from southeast to northeast): Santa Maria, São Miguel, Terceira, Graciosa, São Jorge, Pico, Faial, Flores, and Corvo. There are 615 kilometers between Santa Maria and Corvo. Lisbon lies 1223 kilometers (760 miles) east of the Azores, and New York is 3235 kilometers (2110 miles) west.

All of the islands are volcanic and show conspicuous features of rather recent eruption. The greatest height is in Pico: 2351 meters. Other islands reach about 1000 meters, except Graciosa, with a maximum of 393 meters. The climate is warm-temperate and quite humid; the mean annual temperature is near 17°C. (ca 62°F.) and monthly means descend to 14°C. (ca. 55°F.) and rise to 22°C. (ca. 71°F.) Mean total precipitation runs from 850 to 1000 millimeters (thirty-four to thirty-nine inches.) Although summer precipitation is notably less than winter, it hardly falls below thirty millimeters (one and a quarter inches) in any one month.

The Azores are an integral part of Portugal, of which they constitute three districts: the district of Ponta Delgada (islands of São Miguel and Santa Maria); the district of Angra do Heroismo (islands of Terceira, Graciosa, and São Jorge); and the district of Horta (Faial, Pico, Corvo, and Flores). The total land area, of 2304.48 square kilometers, supports a population of 327,380 (1960).

640517.[9]—NEW YORK

Bronxville lilacs are in full bloom. And azaleas. The leaves at last on the trees, bringing relief from the long nakedness of winter. Parkways not really cluttered as they should be on Sundays.

A long wait in the airport. Am unnerved by the loudspeaker repeatedly calling a mysterious Mr. Evans who missed his rendezvous with destiny.

John Milton shows up forty-five minutes before flight time. Presently we are shut in and rocket upwards. We soon turn to the iciness of the moon side, within the steel bird which carries us. A stop in Boston and then we are over the Atlantic.

We know, we do not see. Do not sleep or you will dream. Do not dream or you will face death again and again. Maintain a controlled, watchful anxiety. Remember, this is meant to be a beginning, not an end.

640518.—SANTA MARIA

Dawn comes soon enough, an orange horizon light which does not spill on the clouds below us. A consolidated oatmeal pavement, lumpy and flat at the same time. Very dead. And then the light does run over the mat, giving relief and life, almost. And soon we descend and some of the clouds are lighter, less opaque, and we fly through them and the morning light is hot and cold on our cheeks, and there are a few tremors and land appears. Remember: what you know is not what you see! The great mid-Atlantic ridge is there, of course; its huge twisted backbone shows a few protruding knots, that is all. We fly over a very black peak with a glimpse of white. Could it be snow on Pico? And then sea, blue and ever so slightly rippled. And now the checkerboard of Santa Maria.

After some confusing formalities which merely repeat former confusions, we reach the Hotel Terra Nostra. As I remembered it: the whole airport district, constructed by United States Air Force, is very ugly, all buildings (including hotel) very flat and utilitarian. Rooms quite comfortable, plumbing adequate and all that. Good breakfast, very graciously served, and we sleep until lunch.

Then walk to the town on black-ribbon, unrelieved roads, and crossing close-cropped, grassy fields with bright masses of blue viper's bugloss *(Echium lycopsis)* and occasional tufts of rigid black rush *(Juncus acutus)*. Vila do Porto today is quite dead. Monday after Pentecost is a holiday. All shops closed. Strangely enough, all churches, too. We wander down to the sea view on a terrace at the lower end of the village. The narrow sidewalk of this poor town a mosaic with black fishes (as it were, swimming upstream) on a white background.

We gently push the door of what looks like an abandoned chapel. At first we see a wooden pulpit with sculptured rail, a simple and beautiful pattern. Then a large wooden cloister grill, in rather poor repair. A woman rises, and we see a rather tragic Ecce Homo in the Iberian style, and a burning lamp. This talkative and cheerful woman (dressed in Franciscan brown, not black) tells of the glories of Saint Anthony. The altar is magnificently and elaborately sculptured (unfortunately painted white). The chapel is now under private ownership. Nothing is done to keep it in good repair, except through the pious efforts of this woman who comes in every day.

Three boys lead us on to the feast of the Imperio. We walk the whole length of Vila do Porto, to the Estação Agraria, which has progressed a good deal since I saw it in 1960. It is very orderly and now has a small zoological garden, with a few deer and pheasants. It overlooks Valverde. They show us with pride two greenhouses which are exceedingly well kept, and we walk on to the *festa.*

Not Christmas or even Easter are as important as the feast of the Holy Ghost in these islands. The whole population has gathered on this terrace, and cookies and bread and wine go around. It is a Sunday crowd, quiet, well-behaved, men mostly in black, even women not too brightly dressed; little girls, on the contrary, with fancy clothes, many frilly petticoats. Mischievous little boys just like anywhere else. Three singers ("foliões") approach us and sing us a song with a refrain that ends with "...Americâ-â-â-nos!" I cannot grasp the rest of it. It is a good-humoured crowd; we, too, are offered bread and wine.

The landscape all around is as lovely as I remembered it from 1960. Every house is set in the landscape just where it should be, in instinctively perfect equilibrium. Tidy fields, some recently ploughed, show a glowing brick-red. Others have young wheat, blue cabbage patches. Every

9 The system which I always use in my field notes and diaries is conserved in this journal to indicate dates; thus 640517 means 1964, month of May (the 5th month), the 17th day.

house has its several tree-daisy shrubs *(Chrysanthemum myconis)*, its neat half-sphere covered with fresh blossoms. Many *Araucaria excelsa* stand very tall against the sky which shows through the finely articulated branches of perfect symmetry, unsheared by the famous high winds. *Eucalyptus* and *Cryptomeria* and maritime pine also form groups, a few Monterey cypresses. Most houses are very small, poor, modest, but recently whitewashed; the deeply-cased windows and the doors often marked by a black or blue line; the chimneys like praying hands.

640519.

Some peasants are ploughing their fields with their red oxen, their wooden ploughs (with a short metal tip). The man goes barefoot and also the woman who follows and sows the grain into the fresh furrows. Medieval or Biblical?

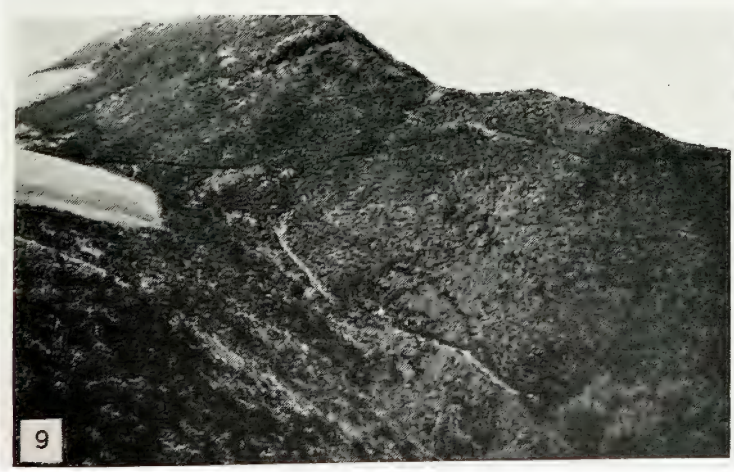
As we walk through the short-cropped pastures, canaries fly all around us, nervous, twittering. Each pond is filled with tiny, green frogs which bark like Chihuahuas! The air is light, the sun is filtered by a caressing haze. The sea fades into a pale blue horizon. The whole landscape is a network of carefully piled stone fences accentuating the contours of the hills. Some of these precarious-looking fences, in which each stone seems to have been chosen for its size and neatly fitted into the only niche that could receive it, must have been very long undisturbed, judging by the lichen vestment that it bears: soft gray parmelias stretch their lacelike proliferations all over them.

We walk a mile or so through pastures, along fences, in a dry stream towards Figueiras, which presently appears, a hundred meters below us: three or four red-tile roofs and the neatly enclosed, tender green vines in their low stonework walls. A little ravine with lush reeds *(Arundo donax)*. Our path is cut into the steep hillside and leads to the quarry. Santa Maria is the only island that has any sedimentary rocks, and this quarry yields practically all the lime used in construction. (Lime for whitewashing the houses has to be imported from the Continent.) Françoise looks for and finds a few fossils, rather a nice-looking shell and a large, though broken, gasteropod (?). The exploitation of this quarry is a long business: rock hammered out of the cliffside, loaded into baskets on muleback, to road where bullock carts take over, and eventually (by cart or truck) on highway to São Pedro where prepared for use.

Opium poppies are scattered all over the crumbling limestone, and myrtle shines, bright green. In the fields below, large purple patches of vervein.

In the afternoon we take off to the Pico Alto (500 meters). The road climbs and twists, cutting into the hard

7. The badlands of Faneca with the catastrophic sheet erosion: a few plants of gorse, broom, and heather are scattered in the field or clumped in ravines. (Santa Maria.) 8. The Faneca badland relief, with the domes of red clay quite bare. (Santa Maria.) 9. Pico Alto with its regenerating laurel scrub (darker areas) and invading *incenso* (lighter areas). (Santa Maria.) 10. Volcanic shoreline at Maia (Santa Maria).



basalt which is covered in places with the yellow flowers of a small stonecrop. The invasion of incenso *(Pittosporum undulatum)* is everywhere in evidence. Large tracts of this Australian plant are allowed to grow about four meters in height, are cut and left to dry on the ground for a month or so, and then carried away. The sprouts soon take over. And so it goes. This is good fuel. The rate of growth of incenso is far superior to that of the native heath, juniper (of which none is left on this island!), laurel, pau-branco *(Notelaea azorica)*.

The panorama from the summit is impressive: we can see the whole island except the villages nested below the steep cliffs, such an Anjos, São Lourenço, Maia, and Praia. The great pink desert of Faneca in the northwest stands out (literally like a sore thumb). Immediately below us, the mixed scrub of heather and incenso and plantings of *Cryptomeria* and pine invest the cone on which we stand. The rest is a checkerboard of fields: red, dark red, light green, and yellow.

We drive down eastward into the valley of Santa Barbara, the town which seems to be best protected from all sides. It shows a great deal of terracing in various stages. The *socalcos* (terrace-steps) are fairly efficient in preventing solifluction. But where they have been neglected (as occurs very frequently in pastured land) they are overwhelmed by soil-slip.

As we wind our way down to São Lourenço various prospects emerge. First is the vista of a steep amphitheatre with its neatly enclosed vineyards. At closer range, it turns out that each enclosure is paved heavily with flat slabs of silvery basalt, and the the vine emerges from a neatly circular opening, about one meter across. The stones serve as a mulch, conserving humidity, and, of course, reducing weed invasion. Each wall ever so neat, the vines well tended, often sprayed. As one looks up, blinking into this great semicircular perspective, it is like a great stained-glass window of shimmering green held together by a leaden framework.

The houses, all white, one-storied with painted corners and window frames, are in a row, with their staring daisies, their flaming geraniums. We seek out the loja and drink the red labrusca wine. A little apprehensive when it is poured into a large tumbler. But it is very light indeed, cool, fresh, green. The people are very kind, offer us some delicious bread.

This is one of the places where I foolishly think I should like to spend months of my life, quietly in a small, uncomfortable but clean house, eating fish and writing, writing, writing . . . And, of course, we talk about it, Françoise and I and John (who has actually done things like this).

On the return trip, we stop at the tile factory in Vila do Porto. The potter, almost as gray as his clay in this half-light, has rather an unusual technique and works in what seems rather an awkward and uncomfortable position. His great jars are lined up in the background, a hopeful storage against the ugly supersedence of plastic!

We get back to the hotel just in time to go down to the airport for the arrival of the Pintos. We are escorted by Senhor Adalberto Pombo, treasurer of the airport, and met by Sr. Armando Monteiro and the Presidente da Camara, Sr. Ernesto Velho Arruda. This is the event of the week—the arrival of the Pan-Am plane from Lisbon. Quitéria and Antonio Pinto da Silva look very well and it is a great pleasure to be together again, and we have a fine dinner and some Portuguese wine.

640520.

This day almost entirely on and around the Pico Alto. It is good to have Antonio with us: he knows practically all the plants, most of the grasses, for instance, which is a great help. In the morning the Presidente comes with us; in the afternoon, we are led by a *guarda florestal* (forest ranger). We hardly see anything that you could call forest.[10] The only true forests are plantations of pine or *Cryptomeria.* The incenso is hardly allowed to grow that tall, even less the laurel. We do see one very large *Persea indica,* but is it indigenous? As for cedro *(Juniperus brevifolia,* or *Juniperus oxycedrus* var. (or ssp.) *brevifolia*), it is no longer wild on Santa Maria. The Presidente shows us a fine specimen in his brother's garden.

From what the guardas tell us, the management of the natural vegetation is a very haphazard affair. The recently established "reserve," near the top of Pico Alto, seems reasonably free of interference, although the juniper is irreversibly gone! I wonder why, at altitudes between three hundred and six hundred meters, laurel, pau-branco, and faya could not reach tree size. Not one individual does. The present scrub is rather dense, gives the impression of being well-balanced, as though indeed it were cold enough, windy enough to determine a climax scrub!

640521.

Today, the badlands of Faneca. As we walk through Paul de Cima, and Pilar, we gather a following of small boys, three of which stay with us all afternoon. Yes, you can talk to them about plants, and about snow in your country and about all the mysteries of the world without and within. So far, this is their world: these domes of red clay with their network of pebbles and their silted ravines with tufts of broom and gorse and heather. These wonderful steep cliffs above the changing sea.

They say Faneca has always been like this: the early colonists found it already bare. And because of the wind? I find this hard to believe, because I see no shearing on the pines, heather, broom, or gorse. The incenso thickets are very thick indeed, virtually impenetrable, what with *Rubus* tangling upwards and downwards. The soil within these thickets, on the periphery of the badlands and on very similar topography, has a humus layer above the clay (or is it fine silt?). The badland itself shows sheet erosion more than any other effect. Wind erosion is secondary. It is not too difficult to visualize the original surface line and to trace the various depths of erosion. The underlying lava is quite solid and the gravelly silt which tops it must have been of considerable depth in many places before the present erosion began. The domes which formed on this material are studded with small pebbles, making marble-like

10 If indeed I stick to my definition of more than eight meters in height and more than sixty per cent coverage. (See Pierre Dansereau, 1958. "A universal system for recording vegetation." Contrib. Inst. Bot. Univ. Montréal **72**:1-58.)

patterns of gray-blue on a red background. These very hard surfaces have no vegetation at all; whereas on flatter areas below the domes, the succession seems to begin with *Ornithopus* and several other annuals which are replaced by the shrubby legumes (which root most readily on softer ground) and heather *(Erica azorica)* which roots even on very compact clay. Various densities of heath-and-broom scrub eventually take over, and faya and pau-branco eventually invade. It would seem that incenso has higher requirements.

640522.

On this final day we see two extreme points of Santa Maria.

In the morning, to Maia in the extreme southeast. Up to the foot of Pico Alto and along a ledge which looks to the southern hills and winds through several villages. The most beautiful is Santo Espírito, with a white church studded with sculptured, porous black volcanic rock. Woodwork inside quite good. Two naive paintings in the choir of wheat-and-vine and of the pelican feeding its young. On the hill above, an active windmill. In the main street, a school with bright-eyed children dancing and singing. And pale velvet donkeys laden with baskets and led by barefoot men.

Ponta do Castelo has a white-and-red lighthouse, and row upon row of vineyards, paved as in São Lourenço, orderly and well-tended. The road winds and unwinds many times in its downward trend and then straightens out and follows a more gentle slope below a cliff down to Maia. The black scoriac rock juts out in disjunct pieces into the sea, cradling small tidal pools and studded with succulent herbs (*Spergularia azorica* mostly). The higher, silted banks are covered with carpets of *Calendula.*

In the afternoon, we reach the other extreme, in the northeast: Anjos is less hemmed-in than Maia and São Lourenço. And it is the tuna-fish centre for this island, with its canning factory. The tuna comes in two species: the large *albacore* and the smaller *bonito.*

In Anjos, also, a nice old church, with a sculptured pulpit of avocado-wood *(Persea indica),* an old stone arch.

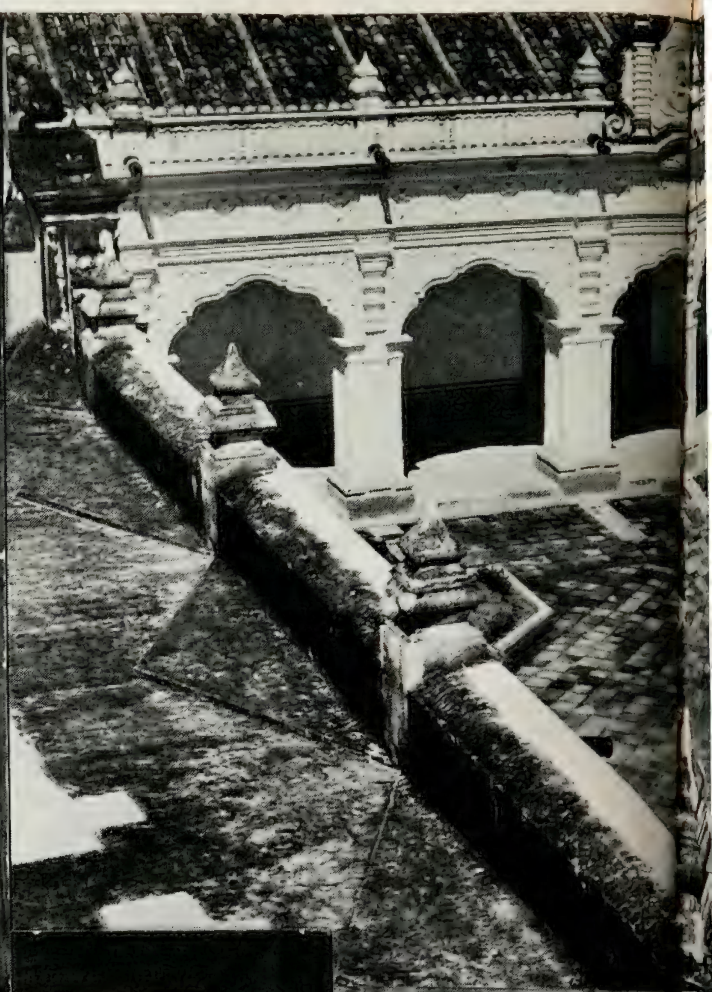
We then walk down a valley between Monte das Flores and Monte Gordo to see more limestone. We find *Parietaria officinalis* and *Campanula erinus,* and *Papaver somniferum.* But the most spectacular is the cliff-hanging *Campanula vidalii,* with lustrous, thick, evergreen leaves (and latex) and a raceme of waxy pink bells.

On the top of the cliff facing out to sea, between Monte Gordo and Rocha de Cré, is a house built by a man from São Miguel. He died recently and was considered "maduro" (batty) by the local population. This house is solidly built, has a little hangar, and a small, walled-in garden. A wild white-flowered cineraria is all over the vertiginous cliffs (introduced by the crazy one?). Yes, this house is for sale!

11. The endemic *Spergularia azorica* on the salt-sprayed volcanic rocks of the shore, at Maia (Santa Maria). 12. Rocha de Cré, a typical escarpment with grassy vegetation (Santa Maria). 13. Old arch of ruined church at Anjos. Sr. Ernesto Velho Arruda, Presidente of the Camara of Santa Maria.

GUATEMALA: LAND OF THE LIVING PAST.

Antigua, capital of Spanish Central America, is now a city
yard (upper center) of one of the hemisphere's first univer
Indians near Lake Atitlán depicts the Spaniards, in pink-
masks are carved of wood and painted by craftsmen who



lysterious Tikal with its pyra-
ids (above), painted stelae, and
alace was once the greatest city
f the early Mayan empire—then
bandoned to the monkeys and
ain forests for reasons unknown.

ous ruins—the dome of a chapel (upper left) and the court-
Carlos Borromeo. Dance of the Conquerors (upper right) by
s, and their conquest of Guatemala's Indians in 1524. The
else.

The marimba is believed to have originated in Guatemala; here (lower center) played by Maya-Quiché boys in the red-embroidered, black garments of their people. Dolls made in Santiago Sacatepéquez (lower right), where women wear multicolored blouses and skirts, are collectors' items. The balancing of baskets and pots on their heads makes for erect posture and graceful walk.

IN NORTH CAROLINA (Continued from page 13)

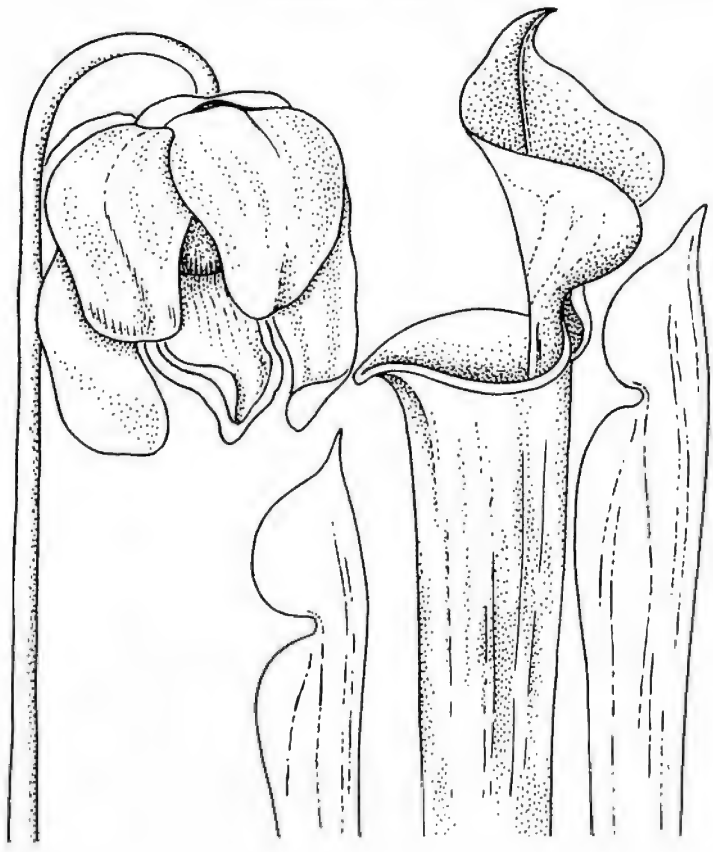
ist whose concern to catalogue every species in an area requires him to explore thoroughly every part of it. We are interested in finding as many species as possible in one place. Obviously this approach would be pointless and would be quickly discarded, if we were unsuccessful in discovering such outstanding locations.

Broadly speaking, there seem to be two chief types of adaptability and two classes of plants to match them. One we might call, more literarily than scientifically, the "Ubiquitous Gang" and the other "Localized Gang." The general idea is that the ubiquitous species are either not too exacting about environment or that the environment which suits them occurs more frequently over a greater range. The commonest members of the great families of plants fit this designation. If we want to collect ubiquitous species, we can do so by traveling extensively and locating one or a few at a time.

The method must be quite different with the "Localized Gang." It is true that we may have to travel rather far, but what we are seeking are not isolated species but a place where a considerable number grow together. Once we have found such a place it is our experience that it is worth revisiting throughout the growing season, because it will reveal a similar wealth of species at other times.

Massachusetts and Connecticut have numerous bogs and we have visited many of them. In each we find a certain number of species and at any given season they will be pretty much the same from bog to bog. But there are a few exceptions. In the unusual bogs we find not only the species of the others but a considerable number which the others lack. They are richer in every way and the botanist or photographer finds he can work much more effectively in one place than in another ten. I am sure this is a pretty general experience.

Sarracenia flava



A superb example of what I mean exists in the neighborhood of Morehead City, North Carolina.

In September, 1963, my wife and I spent a few days at Atlantic Beach near Morehead City. We picked this spot because it seemed to us the nearest place to New York where we could still expect summery conditions, and we found exactly what we wanted. On the way down, a few miles north of the town, we saw flashes of color in a ditch and stopped to look. In a space of some thirty feet was an amazing number of attractive plants, and we vowed to return with the camera during our stay. As it turned out, we were able to visit the place for only a couple of hours one morning. We made a hasty record and then raced around nearby roads. Everywhere in the immediate neighborhood we ran across different plants. It was not a matter of rarities but purely and simply of variety.

This year we were faced with a specific problem. We wished to collect as many photographs of southern flora as possible and, because of other commitments, we knew that our trips would be confined to long weekends. Immediately we bethought ourselves of Morehead and decided to go there at the first opportunity.

It was the end of May. After we crossed the Pamlico River, a marked change in the flora was noticeable. For the first time large clumps of *Sarracenia flava* and the first strands of Spanish moss appeared. We are rather inclined to think that the Pamlico represents the practical northern limits for many southern species.

On this trip, as on the subsequent ones, we concentrated our efforts on the immediate surroundings of our discovery of the previous year, gradually widening our search to a half mile, more or less, in every direction. The yield of species was in every way up to our expectations. But like anyone else we were curious about adjacent regions and could not resist the temptation on each trip to make an excursion sometimes as far as forty miles away. This we found was pure waste of time. There was hardly a single species on these side trips which were not in our special area. What actually happened was that we would travel a long distance with frequent searches in nearby woods and occasionally run across a new species. But we would find these same plants blooming a few days or a month later in our location. There the plants were in profusion and every one hundred yards we seemed to see something new.

Our localized habitat was in part of the Croatan National Forest, and one might think that this had an important bearing. During our trips we crisscrossed the forest by its difficult sandy roads in every direction and made deep penetrations of the forest on foot. We came across terrain similar to our habitat on a number of occasions. The soil appeared the same. The same grasses were growing there, the same trees. Moisture seemed no different. Yet the varieties of species were not to be found. Some marshy areas were fairly floriferous but here, too, the yield of new types was poor. But why our area, and similar areas, are unique is another subject.

We visited Morehead on three occasions—May 29, June 29, and September 3. We explored about seven full days in all, including our fruitless side trips. In our habitat we

found a minimum of one hundred and ten species new to us. This was the larger part of what we found, because most of our previous searching had been done in New York, New Jersey, and New England. Nevertheless there was a considerable number of familiar species. Still others we must have missed. The record, we think, is remarkable when one considers the number of species we must have missed in the early spring, between our visits and after our last one.

Some of the species we found there may be of interest. We found *Lilium catesbaei* and *Nothoscordum bivalve* and among the orchids, *Habenaria ciliaris* (which was familiar), *Cleistes divaricata,* four *Spiranthes,* and *Calopogon pallidum.* There were three hibiscus, five rhexias, three eryngiums, varieties of *Carphephorus* and the closely related *Trilisa,* beautiful relative of *Liatris. Dionaea muscipula,* the Venus-fly-trap was plentiful, as was *Pinguicula caerulea.* There were three new (to us) asclepiads *Marshallia graminifolia* was plentiful. One small area was loaded with the wonderful *Nelumbo lutea,* the American lotus in full bloom. And so forth. I hate to think of what we missed in all this profusion.

One reason for writing about such areas is to call attention to the fact that they are ideal tracts for acquisition and conservation. I doubt that policy in these matters has been much directed towards them. The purchase of reserves often seems to be dictated by sentimental reasons or the sheer availability of so-called unspoiled forest which, likely as not, contains little of botanical interest. The habitats of which I speak are natural nurseries and it is a shame to see them destroyed by water pollution, encroachment, or sheer vandalism. Let us hope that in the future the National Forest and Park Services will appreciate, even more than they do now, the desirability of preserving areas rich in native plants.

Lilium catesbaei

Pinguicula caerulea

GUATEMALA—A BOTANICAL PARADISE (Continued from page 11)

their short trunks, present a contrast to the other forms of plants growing in the forests.

GUATEMALA CHALLENGES THE GARDENER AND BOTANIST. Guatemala has already furnished a wealth of plant material for gardens. Such plants as the tree dahlia, annual dahlias, cosmos, marigold, *Lopezia, Columnea crassifolia, Begonia scandens, Chamaedorea elegans* and other species, ferns, peperomias, many orchids and bromeliads, cactus species, and various heliconias and gesneriads have originated from Guatemalan sources. A spectacular dahlia-like giant herb, *Rojasianthe superba,* with black-and-white heads of flowers, and the purple-flowered shrub, *Uroskinnera,* offer some of the many possibilities of plants native to Guatemala which should furnish the gardener additional material for cultivation. However, only a small percentage of the more than nine thousand native plant species have entered the horticultural field, so that the promise for the future is very great, indeed.

As there are still many areas in Guatemala which have never been adequately explored or even touched botanically, it is inevitable that such places will yield for many years to come an innumerable and endless series of discoveries of plant species. Here the botanist will continue to unearth from such areas many prizes which have hitherto not come to the attention of the plant lover. Thus, Guatemala is and will continue to be a paradise not only for the gardener but for the botanist.

GARDENING IN THE ARDÈCHE, FRANCE

By Alice Dustan Kollar

Mrs. (Samuel) Kollar is a landscape consultant, Garden Editor of the *Newark Star-Ledger,* author, and lecturer. One of her lectures, illustrated with fine colored slides, bears the same title as this article. Mrs. Kollar delivered it at the Garden in the Spring, 1964, Saturday Afternoon Programs.

On one of her trips back to Largentière, her native French town in the Ardèche (Vivarais), Victorine Vianest Wyss was photographed with the ship's captain aboard the Bremen on July 4, 1907.

THE NAME Largentière has always possessed for me a glint far brighter than its translation of "silver land." It was in the small town of this name, in the Ardèche (Vivarais is the old Languedoc name) department of southeastern France, that my maternal grandmother was born and spent her childhood. A silver-mining town in the days of the Romans, Largentière apparently has changed little in size or appearance down through the centuries.

Along in the 1860's, teen-age Victorine Alice Vianest (1848-1938) left Largentière on a great adventure—to settle in America with her oldest brother, François, a master chef on the staff of Delmonico's in New York City. Later, as a traveling companion for various touring families, she earned several trips back to Europe. On one tour she met, in Switzerland, Thomas Wyss (later Wiss) who followed her to America, to become her husband.

And still later, as "Grammy" Wiss, she told her grandchildren little stories about her early life in Largentière—about helping her mother raise silk worms at home; about her father setting out with his cheese, bread, and a gourd filled with claret to visit his several small farms; about the local convent school where she used to be tied to one of the sisters' apron strings because she was tiny and might get lost; about scrambling up the terraced hillside with another young friend to visit a chateau and sample the strawberries in its garden.

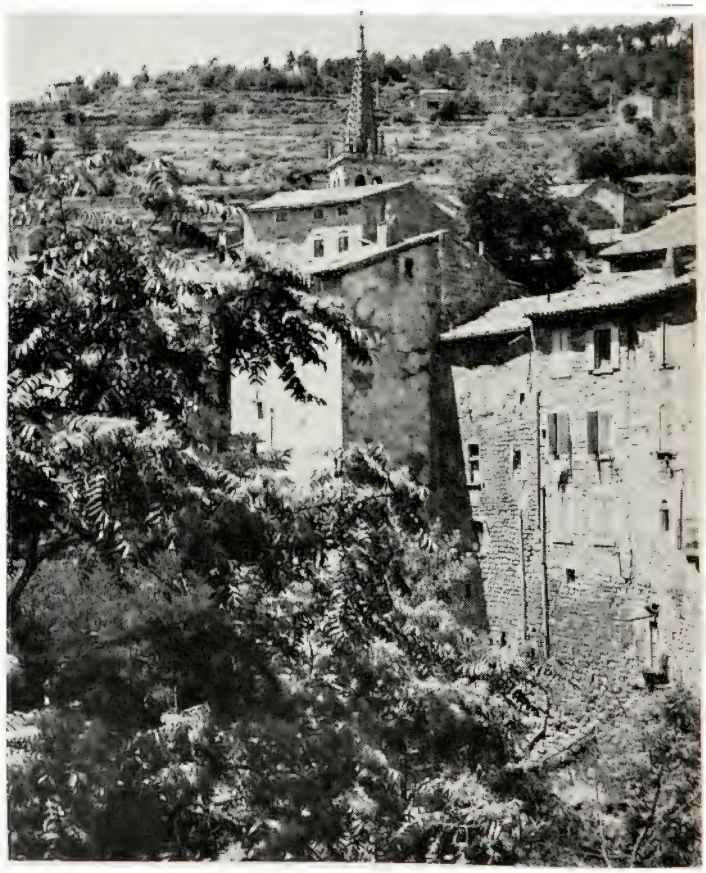
None of Victorine Vianest Wiss' three children, busy working and bringing up their families, ever visited her birthplace. Nor did any of her grandchildren—until 1959, when it was my privilege, with my husband, to spend several days with my distant French cousins (nearest of kin being great nieces of my grandmother). We have since had the pleasure of returning four times to Largentière.

"So poor yet so picturesque" is the way our chauffeur, who taxied us up from Montpellier on a road paralleling the Rhone River, described this remote region. The limestone-ribbed hills of the Ardèche rise to meet the Cevennes Mountains to the north, yet are warmed by the Midi sun on the south.

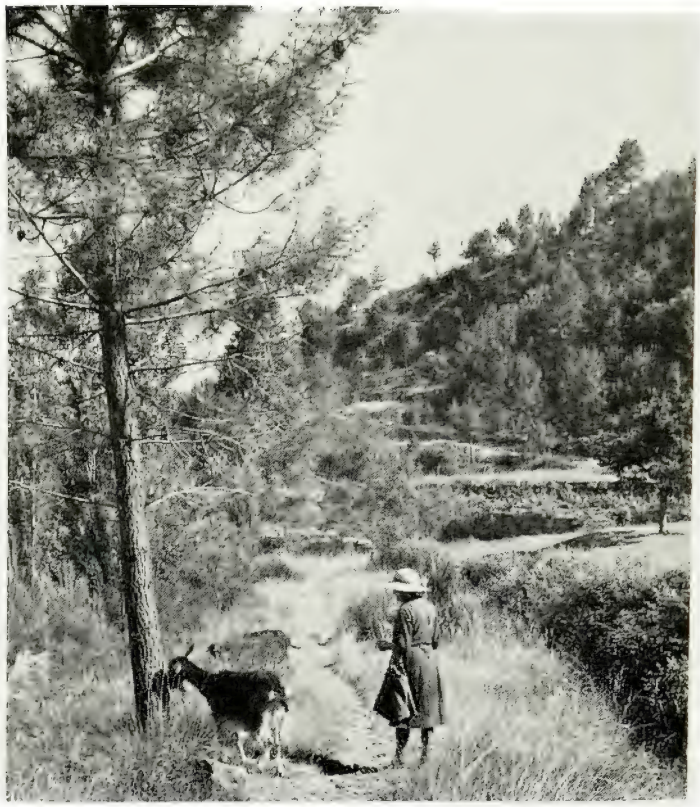
The three generations of my cousins in Largentière live comfortably, if modestly by American standards. Some have lived in Paris and Marseilles but seem content now in their small community, whose former isolation has been erased by the motor age.

Our younger cousins—Cousin Marthe (Mme. Debroas) and her daughter and son-in-law, Cousins Jacqueline and Gilbert (Soboul)—own and run a small garage with apartment above, where we stay with them on our visits. Here, at least some of each sunny day is spent on their huge terrace above the little Ligne River, from which the tile-roofed

A view from Cousin Marthe's terrace takes in the stone houses across the river and the twelfth-century church steeple which shows above their tile roofs. The flourishing tree is an ailanthus.



Extending her basket, Cousin Josephine collects cherries on a sunny June day. The orchard section of *la grange* also yields peaches, plums, and figs; strawberries and grapes grow nearby.



With Nanette, one of her two goats, Cousin Henriette starts up the path from the farmhouse, toward nearby fields and pine forest. Several chickens and rabbits also require daily attention.

stone houses step up abruptly toward the spire of the twelfth-century church.

Pot plants decorate the terrace, which doubles as summer living room and dinette. Looking in one direction, there is a view up Largentière's main street, Avenue de la République. The view we prefer, however, is that of the hillside and open sky, with its beautiful cloud effects and darting *hirondelles,* swallows which nest in cliffs across the street and in the church steeple.

Up near the church, our older cousins own a tiny stone house, the same one in which my grandmother lived so many years ago with her parents and five brothers and sisters. They also have their small farm, *la grange,* at the edge of town. When I asked Cousin Josephine (Mme. Monnier) why she and her sister do not live in their roomier farmhouse, she explained that they do sometimes, in midsummer. However, at other seasons they prefer staying in the town, with close neighbors, as French people have been accustomed to do since the Middle Ages.

These sisters, in their late seventies, have been working their much-terraced piece of land for thirty years. To it they trudge a half mile or more uphill, sometimes twice a day. These frequent visits are necessary not only to tend the crops but to feed the chickens and rabbits, and to pasture and milk the goats. *Les chêvres* are an important part of this small, well-balanced farm, worked entirely by hand.

The milk from the two goats, Nanette and Poupée, ultimately reaches the table as soft cheese. It ripens in little wire-mesh cages which hang from the ceiling of the farm kitchen. Cousin Henriette (Mlle. Blachère), in charge of the animals, explained to us that a goat has two young once a year, during the month of March. She may be milked

In the vegetable patch, Cousin Marthe observes squash pointed out by Cousin Mathilde, down from Paris on a visit in September. At right are the tall thistle-like leaves of cardoon.

Hillsides above the town of Largentière have groves of old, bearing chestnut trees. Olive trees are found at this altitude, too, but the climate is too cool for them to set fruit.

for a period of eight months, giving as much as three liters (a little over three quarts) a day during her most productive three months.

Goat cheese topped off the luscious meal with which these older cousins welcomed us on our first visit in June, 1959. The garden-fresh vegetables were new potatoes, *petits pois,* and *salade verte* of delicate lettuce like our Boston variety. Pièce de résistance was one of their own chickens roasted in their wood-burning stove.

From the first course of home-made vegetable soup to the last of wild strawberries, we were at the table all of two hours. Each course was served and eaten separately, supplemented at intervals by our cousins' own cordials and wines. This leisurely meal reminded me how we, as children, teased "Grammy" Wiss for eating each food item separately. She had retained this habit from childhood, along with her charming French accent.

In January, before our second trip abroad, we had forwarded to these cousins a collection of various kinds of garden seed, which they planted that spring. They found the American varieties of bush bean and looseleaf lettuce especially tasty—but were completely baffled by the sweet corn! That September, we saw at *la grange* a thrifty patch of cornstalks with, alas, ears far past their prime. Our cousins had failed to realize the proper time to harvest this favorite American vegetable, in fact, had never heard of its consumption by humans. There was nothing for us to do but help our cousins cut down the stalks to make fodder.

We didn't miss corn, however, for the variety of vegetables included tomato, eggplant, squash, kale, celery, cabbage, beets, leeks, and beans. Thistle-like leaves, which we at first mistook for those of globe artichoke plants, proved to be a closely related vegetable, cardoon. Because this is harvested as a winter root crop, we did not taste it. Nor have we ever eaten the basic winter dish of the region, *cassoulet,* a casserole featuring white beans and several meats. A favorite dish we did enjoy was rabbit stew, flavored with wine and four herbs—parsley, thyme, bayleaf, and garlic *(l'ail—"juste un peu").* Herbs, and other plant products as well, go into home remedies: for example, dried flowers of the linden tree are brewed into a delicate tea, *tisane,* to drink in winter *"quand on est rhumé."*

What of the winter season in Largentière? Cousin Josephine explains that frost penetrates the ground only about the thickness of a finger; there is a dusting of snow occasionally, but it melts quickly. She sows peas as early as December and lettuce in January, when potatoes are also planted. In March she sets out small tomato plants which she has started on her windowsill in December. Really, one gardens throughout the year in Largentière!

Oleander, hydrangea, fuchsia, oxalis, geranium, and various succulents make a gay garden-in-pots within the town where open space is scarce.

On our early fall visit, fruits in variety were being harvested at *la grange*. Besides plums and peaches there were ten varieties of grapes, rather small but full of flavor from their long season in the sun.

Figs were a fruit my grandmother used to mention, and my husband and I found them a novel treat, picked fresh from the three bushy trees which grow in my French cousins' garden. The figs ripen a few at a time, we were told, from the end of July through August and September, the last ones being dried for winter use.

Our cousins keep their small orchard in sod, and they mulch between some vegetable rows with cut hay supplemented by goat manure. Even so, in the hot, almost rainless Ardèche summers, extra water is necessary for most vegetables.

About five o'clock every summer afternoon that we spent on the farm, my husband and I helped *arroser* the garden. With buckets kept handy beside catch basins, water is carried by hand and gently run into furrows above bean and tomato rows, and allowed to flood small, soil-diked sowings of carrots and salad crops. The large patch of potatoes is never watered.

Like most French people, our cousins love flowers and grow them in variety. Marigolds are among their favorite annuals, which also include petunias, dahlias, balsam, and ageratum. Peonies, iris, coral-bells, Shasta daisies, and chrysanthemums are prominent perennials, in company with Thunberg spirea, white lilac, blue hydrangea, and laurestinus *(Viburnum tinus)*. Geraniums, fuchsias, cacti, and succulents give color as potted plants lined up on the retaining wall which separates the flower garden from the farmhouse terrace, where lunch is enjoyed under the shade of the grape arbor.

Looking from the terrace across the valley on our first visit, my husband and I noticed a church steeple just showing on the opposite hill. Is there another town there? Yes, a small one named Chassiers, our cousins told us. We decided—after being reassured there were no dangerous snakes in the rocks—that Chassiers would be a nice objective for a walk on our own.

On reaching the hilltop, partly by road and partly by

A wisteria clambers up the tower of the chateau in Chassiers, while a plant strictly of the Mediterranean region—the acanthus—blooms at the foot of the flight of outside steps.

short-cut paths up the mountainside, we were charmed by this tiny town of Chassiers and particularly by the Chateau de la Motte, four hundred years old, which must have been the one my grandmother visited in her youth.

Fortunately, on this first of several hikes to Chassiers, one of the members of the family who owns the chateau happened to be there. He dropped his work of restoration long enough to guide us through the turreted stone building, then suggested that we roam around the gardens. We were

Potted plants at the edge of a terrace in Largentière give pleasure to passersby as well as to the owners during their outdoor meals.

fascinated by these gardens as a meeting place for northern plants, such as we know and grow, and those of the Mediterranean Coast. Up the tower clambered a Chinese wisteria, at its base grew a clump of acanthus, a plant we had known previously only as a motif for the carvings on capitals of Greek Corinthian columns. And, again, in the vicinity of slender palm trees stood yew trees, tree peony, mock-orange, and mahonia, an American import. Raised beds, edged with boxwood and accented with the gray-greens of lavender and rosemary, contained a gay assortment of pinks, columbines, irises, and lilies.

The lower level of the gardens we found at its showiest in September, when the dahlias and roses bloomed in box-edged beds about the reflecting pool. Adjacent to this formal garden, on our first visit in June, we enjoyed seeing a big colony of self-sown gaillardias. Beyond it, a gray mat of cerastium edged the parapet which offers an extensive view of vineyards and orchards sloping to the valley.

Along the Ligne River we passed a small factory; it is one of two, at either end of town, which manufacture nylon. In my grandmother's day the same factories spun silk thread, most of the work being done by young women. In spite of their long hours and poor pay, they were a happy lot of girls, "Grammy" told us; one could "hear them singing, singing" at their work as he went by.

On our most recent trip to Largentière, in July, 1964, we heard the cicadas singing, singing during all our walks on the outskirts of the town. We even succeeded in getting a good close-up photograph of a cicada poised on a chestnut twig.

Spreading old chestnut trees grow in grass-carpeted groves on hillsides. In the pattern of sunlight and shade beneath are charming wild flowers. While my husband and I have not had the opportunity to see spring bloom, we observed in July the cupids-dart *(Catananche caerulea)* and two dainty bellflowers. The harebell *(Campanula rotundifolia)* we readily recognized, because it is the same species that we have known as a wild flower in the Finger Lakes region of New York State.

One September day Cousin Mathilde, there on a visit from Paris, went nutting with us. We presented the resulting sackful to Cousin Marthe, who declared with mock disgust that all the chestnuts were either too small or wormy!

In the old days chestnuts were an important crop of the region. A booklet (*En Rêvant Au Bonheur—Contes et Récits Vivarois* by Gaston Delbac, 1938), presented to us by Cousin Josephine, contains a chapter entitled "Dans la Clèdo." *Clèdo,* the booklet explains, is a word in patois which refers to the building where chestnuts were dried. The fire on frosty evenings drew neighbors together in an atmosphere like that of a "sugaring-off" party in Vermont.

Even today, enough chestnuts are gathered in the region to be manufactured into a smooth, vanilla-flavored crème de marrons. To our knowledge, this is the only food product exported from the Ardèche to America. Our cousins' home-made version is even more delicious.

Olive trees grow here and there on the terraced hillsides, too, though the fruits do not often mature this far north. A little painting of these squat, silvery-leaved trees was presented to us by an artist friend, formerly a Paris bookbinder, who retired to Largentière because of its picturesque setting and affable climate.

We have found ideal hiking weather during June and September, indeed even in midsummer, when the Midi sun shines hot but the air is so light it holds little humidity. This has spurred us on to explore the countryside with its challenging variety of plants, some familiar but the majority new to us. Mulberry trees, remnant of silk-production days, seed on hillsides and mingle with native shrubs such as rock-rose *(Cistus).* While Mediterranean cypresses are occasionaly seen near farmhouses, vertical accents in the landscape are more likely to be Lombardy poplars, planted to yield winter fodder for goats. Leafy branches are collected in late fall for storage in the *grenier* or loft.

On our return from hikes through the countryside, our legs attest to the fact that many shrubs of the Ardèche region are "scratchy." Twigs which we collect along the trails are identified by my cousins as those of *cèdre* ("cedar" or juniper), *églantine* (wild rose), *ronce* (wild raspberry or bramble), and *chêne vert* (evergreen oak). Other common *arbustes sauvages* are *genêt* (broom) and *buis* (boxwood), very abundant on the sunny slopes.

Higher up, in the pine woodlands, we were surprised to find—in this limestone region—quantities of heath or *bruyère,* prettiest in September with its pink flowers. Interspersed with the *bruyère* are taller clumps of bracken fern, which my cousins call *fugère.*

The few plants we now recognize around Largentière are, we realize, just a taste of what real botanizing could yield in this open country of the Ardèche. Imagine, then, our excitement on learning that Largentière was the birthplace of one of France's foremost eighteenth-century botanists! An old journal article, found on a visit to the Library of The New York Botanical Garden reads, in translation: "One of my first scientific pilgrimages took me to Largentière where Soulavie was born." This was written by Ch. Flahault, then director of the Institut de Botanique de l'Université de Montpellier, for an introduction to "Au Sujet de la Géographie Botanique de l'Ardèche et du Vivarais" by J. Revol. (Annales Soc. Bot. de Lyon, t XXXV, 1909).

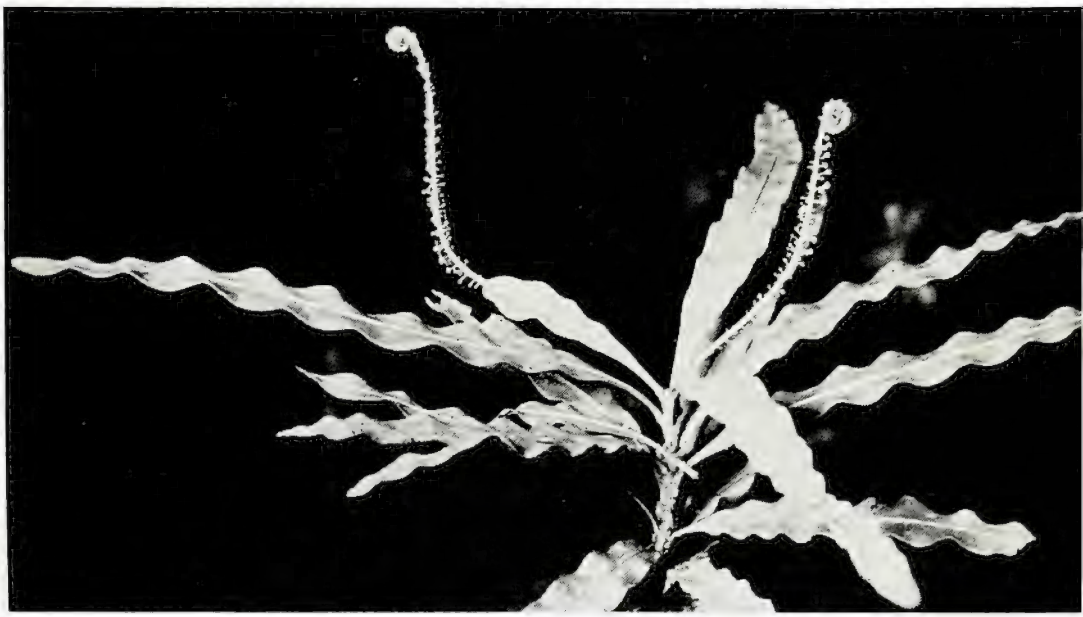
"Le savant naturaliste vivarois" is the phrase that Revol uses in describing Giraud-Soulavie, among whose contributions are several volumes of *Histoire naturelle de la France meridionale.* Far ahead of his time, Soulavie in 1783 expounded the theory that "les plantes sont nos thermomètres," (that is, plant life depends on temperatures at different altitudes.) Thus, from lower Provence to the heights of Vivarais or Ardèche, the reference explains, the different levels can be characterized by the trees which hold first place—the orange, olive, grape, chestnut, conifer and, finally, by the alpine plants.

This same idea has been carried out in present-day vegetation maps developed by France's Ministère de l'Agriculture. Some dealing with this particular region of the Ardèche were shown to us by Dr. Pierre Dansereau of the Garden's staff, who also suggested our obtaining a copy of the comprehensive botany book, *Les Quatre Flores de France* by P. Fournier (éditions Paul Lechevalier, 1961).

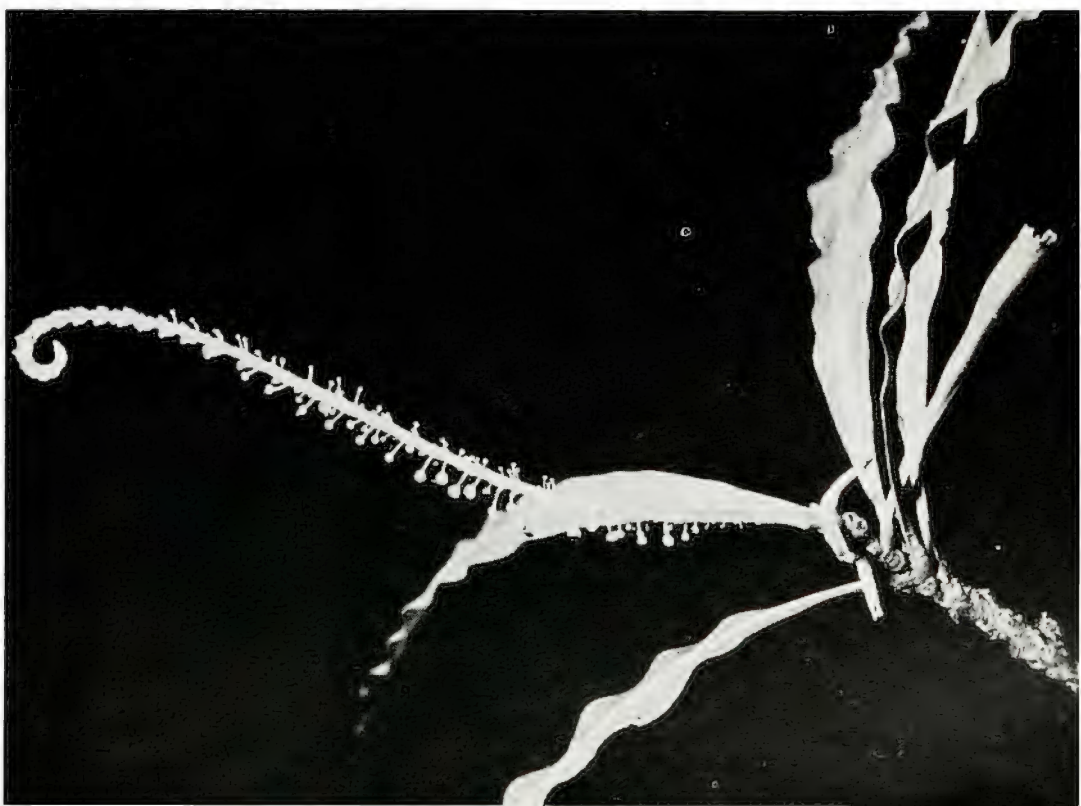
A valuable source of help abroad is France's oldest botanic garden, Jardin des Plantes at Montpellier. In addition to its fine reference library, it includes an outdoor collection of plants of the limestone region of the Ardèche.

Here are two kinds of leaves on the tropical African vine known as *Triphyophyllum peltatum*. The straight leaves with pointed tips are photosynthetic. The leaves with pairs of hooks at their tips are used primarily for climbing.

This branch tip of *Triphyophyllum peltatum* displays the long, lancelike photosynthetic leaves and also two of the strange glandular leaves. One of these has a partial blade, and from its tip the midrib protrudes several inches, studded with glands of unknown purpose at the tips of little pillars. To the right is another glandular leaf, devoid entirely of blade.



This close-up of a glandular leaf of *Triphyophyllum peltatum* shows the tiny pillars supporting the glands, all along the midrib. This leaf has no blade, though sometimes the blade is present. This structure might easily be mistaken for the inflorescence.



FOR TEXT ON THE AFRICAN VINE (See pages 30 and 31).

AN AFRICAN VINE WITH THREE KINDS OF LEAVES FOR THREE DIFFERENT JOBS

By EDWIN A. MENNINGER

Mr. Menninger, who enjoys a world-wide reputation as "The Flowering Tree Man," is the author of several books; the latest, *Seaside Plants of the World* (1964), is a guide to salt-resistant gardens for all climates. The photographs and drawings are by Francis Hallé, Botanist, Office de la Recherche Scientifique et Technique Outre Mer, Abidjan, Ivory Coast.

ALL THE ORDINARY LEAVES of most plants are more or less the same size. Occasionally two or more differently shaped leaves are found on the same shrub or tree, as for example the common sassafras.[1] In a few cases—*Eucalyptus* is typical—trees have leaves when they are young which are exchanged for entirely different leaves when the plant reaches maturity; the adult leaves differ not only in size and shape, but often in their arrangement on the stems.

All of these leaves fulfill exactly the same purposes, collecting energy from the sun and food from the atmosphere, feeding the plant and shading its roots. Some vines have modified leaves, either with hooks or tendrils to assist in climbing, but the leaves continue to act as food laboratories. Many leaves are equipped with tiny glands at the base or along the midrib or on the under surface, which play a part in the plant's metabolism, but again these do not interfere with the main function of the leaves—photosynthesis.

Now consider the leaves of a great woody climber in west tropical Africa called *Triphyophyllum peltatum.*[2] It is one of the few plants in the world which have three different kinds of leaves, each with a different purpose or function in life.[3] This vine or liana has been reported from Ivory Coast, Liberia, and Sierra Leone. Hutchinson & Balziel[2] call it a "scandent shrub or liana," but Hallé reports that in the Ivory Coast it is a heavy, woody vine.

The name of the plant pinpoints its unusual form, because *Triphyophyllum* means literally "leaves of three shapes." Its unusual peculiarity lies in the fact that each form of leaf serves a special and particular need.

The first kind of leaves produced on *Triphyophyllum* is commonplace. Occurring on short shoots, in shape they are oblong-oblanceolate, eight to fourteen inches long, and from one-half to two inches wide. Obviously their purpose is photosynthesis.

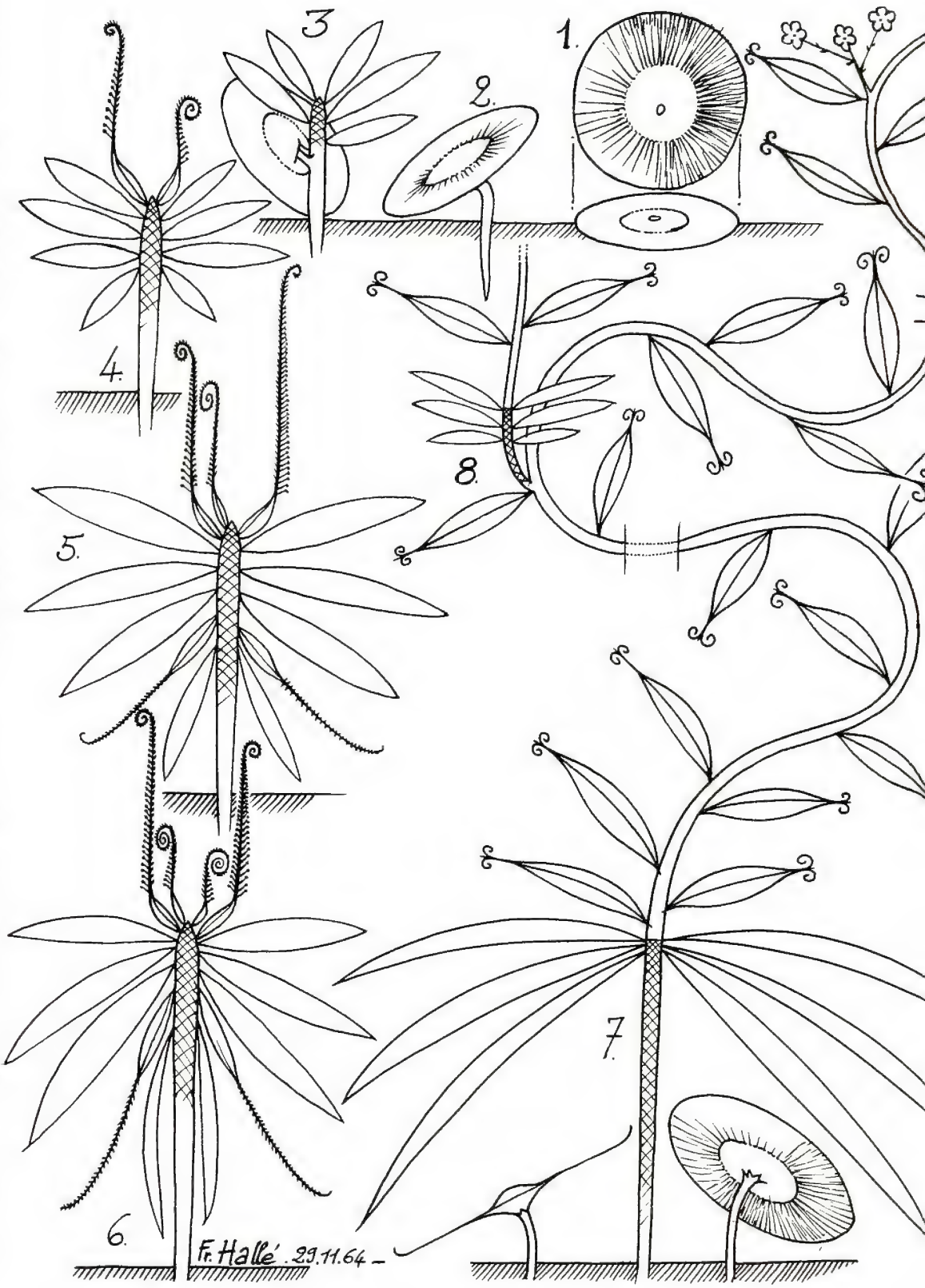
The second kind of leaves occurs on long, young shoots with long internodes. They are narrowly oblong-elliptic, cuneate at the base, obtuse at the apex, four to seven inches long, one-half to one and one-half inches wide, the midrib broken down at the apex to form a pair of hooks to help the vine catch hold and hang to any support it encounters. This feature is not uncommon. The big potato vine[4] has heavy, vicious hooks on the under side of the midrib of each leaf, very useful to the plant in clinging to anything which comes near; but this feature does not interfere with the leaf's usual function. The tips of all the leaves of the climbing lily[5] are split into tendrils which catch and hold to anything they can encircle, as naturally as do ordinary vine tendrils; again this does not interfere with the leaf's regular job.

The third kind of leaf on *Triphyophyllum* is particularly strange. It is produced on juvenile shoots, among normal leaves, according to an endogenous rhythm which is not understood. The blade of the leaf is much reduced in size or may be absent entirely, but the midrib is stout, very prominent, and may be six to ten inches long. Instead of emerging from the leaf bud on a straight, horizontal plane and enlarging gradually, the third leaf emerges as a coil, unfurling its tip like a Hallowe'en blowpipe or exactly like the leaf of a fern. This midrib is crowded with scores of glands set on little pillars, sticking out in all directions, giving the effect of an inflorescence. Actually these glands on the midrib out to the tip are distant from the flowers which are produced sparsely in tiny clusters in the axils of leaves lower down in the cluster. In herbarium material these flowers are inconspicuous, but in the forest they are white, pretty, and fragrant. The seed body which follows them is less than one-half inch across, but it is surrounded by a broad wing, two to four inches across, and from this overhang is derived the epithet *peltatum.* The seed wing when young is a vivid pink or red, and very decorative in the forest.

What the purpose of these glands on a special leaf might be inevitably has given rise to much speculation. Obviously this third leaf is not concerned with the problems of photosynthesis, nor with the job of supporting a heavy vine. Climbers in any dense forest have difficulty getting enough light to survive (first leaf) and must ascend to the tree tops (second leaf) to catch the sun, but this third leaf is no help in either of these projects. Many plants have glands on their leaves. In some the purpose is to trap insects which by some special apparatus are digested or used as humus. The sundew[6] and the pitcher plants[7] are examples of this. Many other plants have glands on the leaves or their stems, which are nectaries or honey-secreting organs supplementing those in the flowers. Some leaves, like those of the candlenut and the tung[8], have glands which secrete oil. Some leaf glands secrete water; others, like species of *Plumbago* and *Saxifraga,* secrete calcium suspended in water so that when the liquid evaporates, a thin film of powdered calcium remains on the leaf.

Presumably the objective in most of these cases is to assist in some way in the metabolism of the plant, just how is not always clear. Does the third leaf of *Triphyophyllum* belong in this category or is there some further purpose which this over-developed gland center can serve?

Hallé offers some field notes on this subject: "No one knows what purpose the glands have. They secrete a sticky liquid and insects often stick on them, but these insects



Schema of the life-cycle and growth-habit of *Triphyophyllum peltatum* Hutch. & Dalz.) Airy Shaw *(Dioncophyllaceae),* in rain forest of Ivory Coast, West Africa.

1, 2, 3. The seed and the germination. Seed diameter, two to three inches.

4, 5, 6. Three aspects of the young plant. Stem three to six inches high. Note the short internodes and the alternative production of normal leaves and circinate gland-bearing leaves.

7. The liana appears. Note the long internodes and the leaves with hooks.

8. As the seedling, the young lateral axis bears normal leaves (and sometimes gland-bearing leaves). Then a lateral liana appears, with long internodes and leaves with hooks.

9. The flowering of the *Triphyophyllum,* at the canopy forest, one hundred to one hundred and fifty feet high. Flower pale yellow and sweet-smelling. Fresh seed pink.

stay intact on the glands and never are digested as in the case of *Drosera.* The gland-bearing leaves may occur only one or two at a time, or anywhere up to five or six at a time, and they are produced rhythmically among the clusters of normal, photosynthetic leaves. The gland-bearing leaves do not play any part in the pollination of the flowers."

Mr. Hallé has sent specimens of *Triphyophyllum* to Professor Daniel B. Ward, who is keeper of the herbarium at the Agricultural Experiment Station, University of Florida, Gainesville.

1 *Sassafras albidum* Nees.

2 *Triphyophyllum peltatum* (Hutch et Dalz.), Airy Shaw in *Kew Bulletin* 1951: 342 (1952), was separated from the parent genus *Dioncophyllum* which had first been described by Baillon in 1890 (Bull. Soc. Linn. **2**:870). It was then included in *Flacourtiaceae.* Hutchinson & Dalziel in 1927 (*Flora of West Tropical Africa,* ed 1, **1**:165) described the species as *D. peltatum,* and supplemented this description in 1928, (*Kew Bulletin* 31). In 1951 Airy Shaw (*Kew Bulletin* 327) separated the genus *Dioncophyllum* from the *Flacourtiaceae,* naming it the *Dioncophyllaceae,* and dividing the species into three genera, the new ones being *Habropetalum* and *Triphyophyllum.* At first Hutchinson was unwilling to agree to this segregation (see *Families of Flowering Plants* **1**:207) but later he accepted Airy Shaw's treatment (*Flora of West Tropical Africa,* ed. 2, **1**:194).

3 Many aquatic plants like *Sagittaria* sp. have submerged leaves, floating leaves, and aerial leaves.

4 *Solanum wendlandii* Hook. *f.*

5 *Gloriosa rothschildiana* O'Brien.

6 *Drosera* sp.

7 *Nepenthes* sp.

8 *Aleurites* sp.

BRIEF NOTES ON RECENT BOOKS

FLOWER ARRANGEMENT

FLOWERS AND FESTIVALS OF THE JEWISH YEAR. Freehof, Lillian S. and Lottie C. Bandman. 192 pages, illustrated, indexed. Hearthside Press, New York. 1964. $5.95.

Home makers and garden club members as well as those charged with the responsibility for appropriate floral decorations for temple or synagogues will find this an informative, useful book. Folklore and traditions, ceremonies and blessings are carefully explained by the authors who are members of temple sisterhoods, so are thoroughly conversant with the Jewish year and its festivals; and, as members of a Pittsburgh garden club, are experienced in the art of flower arrangement.

ARTIFICIAL FLOWERS, FRUIT AND FOLIAGE. Schmitt, Mimi. 125 pages, illustrated, indexed. Hearthside Press, Inc., New York. 1964. $4.95.

The making of artificial flowers, fruit, and foliage has grown in recent years into multimillion dollar business, so it follows that there is an interest in arranging them. Mrs. Schmitt, an accredited judge of the National Council of State Garden Clubs, demonstrates and teaches flower arranging with fresh flowers and with "permanent" flowers, and in this book she gives advice to the novice and to the more skilled arranger on the techniques of handling artificial material.

DRIED ARRANGEMENTS AND DECORATIONS. Squires, Mabel. 95 pages, illustrated, indexed. M. Barrows & Co., Inc., New York, N.Y. 1964. $3.25.

A handbook for beginners on how to use dried flowers and other dried material in making arrangements and decorations. Basic information on drying plant material, containers, mechanics, and so forth are also furnished by Mrs. Squires, an Accredited Judge of the National Council of State Garden Clubs and the New York State Chairman of National Council Flower Show Schools.

MODERN ABSTRACT FLOWER ARRANGEMENTS. Cyphers, Emma Hodkinson. 128 pages, illustrated, indexed. Hearthside Press, Inc. New York, N. Y. 1964. $4.95.

Mrs. Cyphers, who has seven books on various aspects of flower arrangement to her credit, discusses in her latest book the differences between the traditional and recent trends in floral art; the selection of plant material and container, and lighting to produce dramatic effects at home and at exhibitions.

ILFORD COLOR BOOK OF FLOWER DECORATION. Groves, Joan. 112 pages, illustrated (color). McGraw-Hill Book Company, New York. 1964. $3.95.

Fifty-four plates in color illustrate the flower arrangements and "planted gardens" made by Mrs. Groves, of the Constance Spry Flower School.

There are instructions on "The Care of Cut Flowers," "Setting the Flowers in Place," and "Photographing the Flowers in Color"—the latter by Kenneth Gaseltine; also horticultural notes on a variety of plants and notes on making the illustrated "planted gardens" and arrangements.

FLOWERS

ROSES. Kordes, Wilhelm (trans. and ed. by N. P. Harvey). 240 pages, illustrated (part color), indexed. Reinhold Publishing Company, New York. 1964. $6.95.

Most rose growers, be they amateur or professional, recognize the name of William Kordes as that of one of the leading breeders and growers of roses. (His nursery is one of the largest in Europe). He writes concisely, from his lifetime experience with roses, on their cultivation and hybridization.

The book includes valuable lists of varieties with notes on their color, degree of hardiness, fragrance, and height.

A GALLERY OF FLOWERS. Bazin, Germain. 206 pages, illustrated (color), indexed. Appleton-Century, New York. 1964. $8.95.

From his knowledge of the fascination which flowers have for painters, Mr. Bazin, Chief Curator of the Louvre, has prepared in interesting study of flower painting from classical antiquity through the Middle Ages to the Impressionists and the present day.

He names the flowers, in the paintings under discussion, according to the Linnaeau classification whenever possible. Mr. Bazen also gives many fascinating insights into the part played by flowers in the culture of mankind.

SORT GUIDE TO THE PERENNIAL GARDEN FLOWERS. Kelly, George W. Crown Publishers, Inc. New York. 1964. $4.95.

Over one hundred and fifty perennials described concisely on punch cards and illustrated, some black and white, some color; the opposite side of each card, the index, is the same for all, and guides in selecting the particular perennial for a particular location, height, color, character of bloom, season of growth. The cards are contained in a transparent, flexible, plastic case.

FLORA

A FLORA OF CAMBRIDGESHIRE. Perring, F. H., P. D. Sell, S. M. Walters; the section on Bryophyta by H. L. K. Whitehouse. 366 pages, illustrated, indexed. Cambridge University Press, New York, N. Y. 1964. $5.50.

This new flora, a cooperative effort by a large number of professional and amateur botanists, is dedicated to Ray whose important treatment of the plants of Cambridgeshire was published in 1660, to Relhan who published in 1785, and to Babington who resurveyed and published accurately in 1860.

In the Introduction, the geographical areas—Fenlands, Chalk, Boulder Clay, Brechland, Greensand, and Salt-Marsh—and the types of vegetation are discussed. Then follows an "Account of the Species," some fifteen hundred being included.

FERNS

THE GARDENER'S FERN BOOK. Foster, F. Gordon. 226 pages, illustrated, indexed. D. Van Nostrand Company, Inc., Princeton, N. J. 1964. $7.95.

This book will serve the gardener or nature lover as a valuable source of information on native and exotic forms, how to grow them, how to propagate them, and how to use them in home and garden.

Mr. Foster has successfully combined his profession—he is a microscopist with the Metallurgical Research Department of Bell Laboratories—with his hobby of ferns. He grows most of the species native to northeastern United States in his New Jersey garden, and many of the exotic forms in his home, and uses his camera and microscope to record the changes of ferns in their life cycle.

THE SOUTHERN FERN GUIDE. Wherry, Dr. Edgar T. 349 pages, illustrated, indexed. Doubleday & Company, Inc., Garden City, N. Y. 1964. $4.95.

One of Doubleday Nature Guide Series, this book deals with the ferns of the southeastern and south-midland United States. It briefly discusses the fern life cycle, classification, southern fern distribution, fern culture, raising ferns from spores; presents keys, and then the descriptions of about one hundred ferns, which are illustrated with line drawings by two brothers, James C. W. and Keith C. Y. Chen.

Dr. Wherry, who is Professor of Botany, Emeritus, of the University of Pennsylvania, is the author of several books—among them *Guide to Eastern Ferns* and *The Fern Guide*. He dedicates his latest book to "the memory of John Kunkel Small, eminent authority on the plants of the southern states who in 1923 introduced me to our subtropical ferns." Dr. Small was Chief Research Associate and Curator at The New York Botanical Garden until the end of 1937.

GARDENS AND GARDENING

GARDENS OF ITALY. McGuire, Frances Margaret. 223 pages, illustrated, indexed. M. Barrows and Company, Inc., New York. 1964. $4.95.

A charming personal account of twenty-two beautiful gardens in Italy, sixteen of which are open to the public. Mrs. McGuire, a writer of talent, became acquainted with these gardens when her husband served as Australian Ambassador to Italy. She played no small part in the renovation of the long-neglected garden of Villa Vittoria, the Australian Embassy.

ON GARDENING. Jekyll, Gertrude. 283 pages, illustrated. Charles Scribner's Sons, New York. 1964. $6.00.

An anthology selected from the books of this notable English gardener and landscape designer whose advice, as her fame spread, was widely sought. Many of Great Britain's gardens owe their beauty to her genius.

An introduction has been written by Elizabeth Lawrence, author of *Gardens in Winter* and *The Little Bulbs*, who has long been an appreciative reader of Miss Jekyll's works.

THE ENGLISH GARDEN. Hyams, Edward. 288 pages, illustrated (part colored), indexed. Harry N. Abrams, New York. 1964. $25.00.

The beauty of the gardens which have made England famous are captured in the magnificent black and white and colored photographs by Edwin Smith. They handsomely illustrate Edward Hyam's thorough text on the historical traditions of landscape art and gardening in the British Isles and on the great diversity of plants imported from many parts of the world to enhance the gardens created down through the

centuries by renowned landscape artists for their patrons.

GARDENS OF DELIGHT. Hadfield, Miles and John. 192 pages, illustrated (part color), indexed. Little, Brown & Co., Boston, Mass. 1964. $7.95.

The enchantment of gardening as "illuminated by poets and philosophers, diarists, and travelers, and as illustrated by painters and potters, draughtsmen and sculptors" is reflected in the pages of this attractively presented volume. Their selections from the literature and the arts span the centuries—from the fifteenth through the twentieth.

HERBS

HERB GARDENING IN FIVE SEASONS. Simmons, Adelma Grenier. 352 pages, illustrated, indexed. D. Van Nostrand Co., Inc., New York. 1964. $16.95.

Plans for herb gardens, information on how to grow herbs outdoors and indoors, harvesting and drying them, winter protection of herbs, legends, recipes, and chapters devoted to such herbs as "The Scented Geraniums," "The Versatile Thymes," "The Mighty Mints," "The Artemisias"—all this is just an inkling of the wealth of information on growing and using herbs to be found within the pages of this book.

The author really knows whereof she writes for she has developed, during the past fifteen years, the famous Caprilands Herb Farm in Connecticut. In addition to managing this farm, Mrs. Simmons holds educational exhibits there and elsewhere, lectures widely, and counsels on public herb gardens.

HOUSE PLANTS

HOUSE PLANTS FOR CITY DWELLERS. Sutcliffe, Alys. 159 pages, illustrated, indexed. E. P. Dutton & Co., Inc., New York, N. Y. 1964. $3.95.

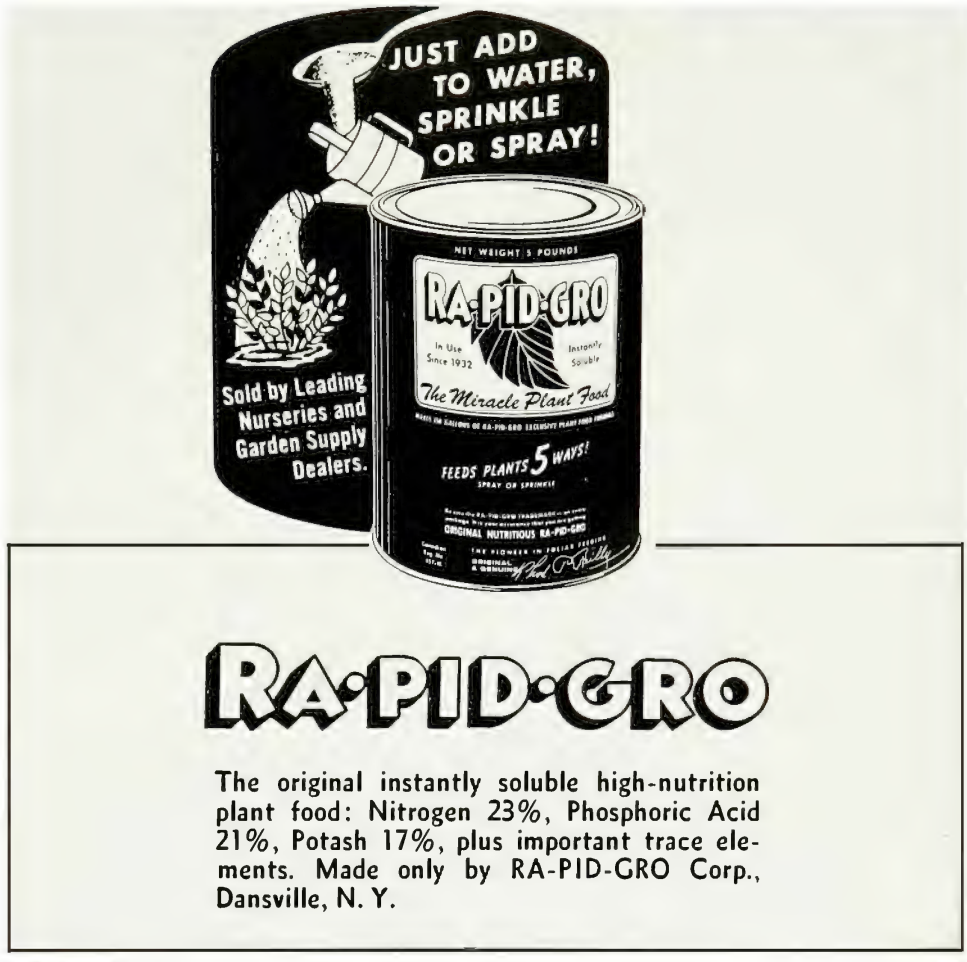
Those who live in cities will welcome this informative, easy-to-follow book on how to cope with plants under trying circumstances. The chapters on bulbs, flowering plants, foliage plants, ferns, cacti, and succulents are accompanied by lists of plants which can be grown under average city conditions, and by cultural hints on how to meet their requirements. There are also chapters on discouraging pests, propagation, and dish gardens and terrariums.

The author has been Horticulturist of the Brooklyn Botanic Garden for a number of years; besides teaching, lecturing, and writing, she conducts a very popular telephone garden-information service during certain hours of the day.

SEEDS

SEE HOW THEY GROW. Fogg, H. G. Witham. 100 pages, illustrated, indexed. Charles T. Branford Co., Newton Center, Mass. 1964. $3.95.

From his own experience Mr. Fogg describes in word and picture how the adventurous gardener may raise from seed fascinating and unusual plants from different parts of the world. He does include some well-known plants, but places emphasis on those not ordinarily seen in the home greenhouse or living-room windowsill.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TREES

DECIDUOUS FORESTS OF EASTERN NORTH AMERICA. Braun, E. Lucy. 596 pages, illustrated, indexed, bibliography. Hafner Publishing Co., New York. 1964. $12.50.

This is a facsimile of Dr. Braun's important reference volume, published in 1950 and based on the more than twenty-five years she spent in studying the deciduous forests of eastern North America—in the field and through literature on the subject.

ECOLOGY

FOREST ECOLOGY. Spurr, Stephen H. 352 pages, illustrated, indexed. The Ronald Press, New York. 1964. $8.50.

This textbook is based on the author's lecture notes used at the University of Michigan, where he is Professor of Natural Resources and Dean of the School of Natural Resources.

The first chapter presents "Concepts of Forest Ecology." The other seventeen chapters are presented under three subdivisions: "The Forest Environment" dealing with autecology; "The Forest Community" with synecology; and "The Forest" with phytogeography.

PLANT COMMUNITIES OF SOUTHERN ILLINOIS. Voigt, John W. and Robert H. Mohlenbrock. 202 pages, illustrated, indexed. Southern Illinois University Press, Carbondale. 1964. $5.95.

The authors spent ten years in the preparation of this book to give the general reader a well-rounded picture of plant relationships in southern Illinois, an "area of great scenic beauty, of unusual floristic composition, interest, and overlapping vegetational patterns."

While the text is presented in a manner understandable to those who do not have specialized training, it should also prove useful to workers in the fields of forestry, wildlife and conservation.

BOTANY

BOTANY: AN INTRODUCTION TO PLANT SCIENCE, 3rd ed. Robbins, Wilfred W. T., Elliot Weier, and C. Ralph Stocking. 614 pages, illustrated, indexed. John Wiley & Sons, Inc., New York, N. Y. 1964. $8.95.

This, the third edition of *Botany*, which was first published in 1950, takes into consideration the present interest in molecular biology. Accordingly changes have been made in areas most influenced by the new developments—in aspects of the cell, in photosynthesis and respiration, in inheritance, and so on. A chapter on "Novel Genetic Systems" has been added.

MISCELLANY

AUDUBON'S WILDLIFE. Teale, Edwin Way. 256 pages, illustrated (part color), indexed. The Viking Press, New York. 1964. $15.00

For the dramatically presented volume, the author, well-known naturalist, author, and photographer, has chosen some of the most beautiful of Audubon's paintings of birds and animals, and several of John Woodhouse Audubon, Audubon's gifted son, and selections from Audubon's writings. To this material he adds his own fascinating account of the man who knew and loved the American wilderness and its wildlife.

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SONG AND GARDEN BIRDS OF NORTH AMERICA. Wetmore, Alexander. 400 pages, illustrated (mostly color), indexed. National Geographic Society, Washington, D. C. 1964. $11.95.

Dr. Wetmore, former Secretary of the Smithsonian Institution, and a Trustee of the National Geographic Society, served as chief author and consultant for this colorful book on over three hundred species of American birds in their natural settings. Fourteen notable ornithologists, including the late Arthur A. Allen, E. Thomas Gilliard, Crawford H. Greenewalt, Roger Tory Peterson, Frederick Kent Treslow, and Allan D. Cruickshank contributed to the thirty chapters which delineate by family groupings the songbirds usually found north of Mexico.

A unique feature is the inclusion of an album of six long-playing, high-fidelity discs which record the songs of seventy birds.

ALGAE AND MAN. Jackson, Daniel F. (ed.). 434 pages, illustrated. Plenum Press, New York, N. Y. 1964. $14.50.

Here are the proceedings of the Advanced Study Institute "Algae and Man," held at the University of Louisville, Kentucky, and sponsored by the Scientific Affairs of NATO. The purpose of the Institute was to examine concepts on the biology of algae and to discuss the effects, beneficial and detrimental, on the human organism.

The papers presented at the Institute and included in *Algae and Man* bear on taxonomy, cytogenetics, physiology, and ecology; toxic algae, water supplies, pollution, water blooms, etc., are also covered.

THE SOYBEAN. Norman, A. G. (ed.). 239 pages, author and subject indexes. Academic Press, Inc., New York, N. Y. 1963 (rec'd. 1964). $6.50.

The genetics and breeding, physiology, nutrition, and management of this important crop, which comprise the four sections of this book and were originally published in *Advances in Agronomy*, have been revised and brought up to date.

Though it has a long history in China, and though there has been a substantial acreage in the United States for only the past twenty years, the United States now produces about sixty per cent of the world crop of soybean.

HOW TO USE A MICROSCOPE. Hartley, W. G. 255 pages, illustrated, indexed, appendix. Doubleday & Company, New York, N. Y. 1964. paper $1.45.

This admirable book, originally published in England in 1962, has been edited by John J. Lee and Bernard Friedman to bring "the terminology more into line with domestic usage and [reference] to makes and components in more general use in the United States than in Great Britain." It is published as an American Museum Science Books edition by arrangement with the English Universities, Ltd.

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FLOWERS OF THE HOLY LAND. Vester, Bertha Spafford. 80 pages, illustrated (25 color reproductions of original water colors). Doubleday & Company, Garden City, New York. 1964. $2.50.

This third edition, new and enlarged, will be well received; the first edition, which was published in 1962, contained seventeen reproductions of Mrs. Vester's exquisite water colors. It makes a lovely gift.

GENERIC NAMES OF ORCHIDS. Schultes, Richard Evans and Arthur Stanley Pease. 331 pages, illustrated. Academic Press, New York, N. Y. 1964. $12.00.

This dictionary explains the etymological history of the more than twelve hundred generic names of the *Orchidaceae* and the characteristic of each plant leading to the choice of its generic name.

The comprehensive Introduction covers the Orchid Family ethnobotanically, historically, and taxonomically.

In "A Note to Orchidists," Gordon Dillon, Editor of the *American Orchid Society Bulletin*, writes, "For the prosaic orchidist, this unique book, a long-desired work, will prove to be an invaluable reference . . For the more imaginative orchidist, the volume will offer this and more. . . ."

THE STORY OF GARDENING. Wright, Richardson. 474 pages, illustrated, indexed. Dover Publications, New York, N. Y. 1963. (rec'd 1964). paper $2.00.

This edition, published in 1963, is an "unabridged and unaltered republication" of the book originally published in 1934. Its pages are replete with the history and development of gardening and gardens through six thousand years, with garden lore and garden art, with the philosophy and the literature of the different eras from the days of Nebuchadnezzar and the hanging gardens of Babylon to "The Threshold of our own Times."

FACE OF NORTH AMERICA. Young Reader Edition. Farb, Peter. 254 pages, illustrated, indexed. Harper & Row, New York. 1964. $3.95.

The specially prepared Young Reader Edition of Peter Farb's widely acclaimed *Face of North America* should be placed in the hands of any junior or senior high school student who has a bent toward natural history and is interested in learning about the interplay of plant and animal life and of the age-old forces of nature at work."

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COCONUT GROWING. Piggott, C. J. 109 pages, illustrated, indexed. Oxford University Press, New York, N. Y. 1964. $2.60.

One of the Oxford Tropical Handbooks, this is of particular interest to managers of plantations, though the information on modern agricultural techniques in growing coconut palms and the control of diseases and pests will also be useful to the small holder.

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with scarlet band. (This plant sells
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Swallow 'Exbury' F.C.C./RHS Alexanderi x Pauwelsii
Yellow of great renown. $8.50 each

Sea Foam 'Green Fire' AM/AOS
Apollo x Blue Smoke
Very fine green. $8.50 each

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plant easy to grow and flower.
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White with perfect shape, broad
petals and sepals.
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THESE WE INHERIT: THE PARKLANDS OF AMERICA. Adams, Ansel. 103 pages, illustrated. Sierra Club, San Francisco, Cal. 1964. $15.00.

Derived in large part from *My Camera in the National Parks* by the same author and published by Virginia Adams, Yosemite National Park, and Houghton Mifflin in 1950, but other areas are included in this new work of a great conservationist and talented photographer.

Forty-two of the pages are devoted to superb plates.

BIRDS OVER AMERICA. Peterson, Roger Tory. 342 pages, illustrated, indexed. Dodd, Mead & Company. New York, N. Y. 1964. $7.50.

When *Birds over America* was originally published in 1948, it was acclaimed as an outstanding work and received the John Burroughs Award. This 1964 edition is revised and enlarged to encompass the information Mr. Peterson has gathered during the intervening years.

CORN AMONG THE INDIANS OF THE UPPER MISSOURI. Will, George F. and George E. Hyde. 323 pages, illustrated, indexed. University of Nebraska Press, Lincoln, Nebr. 1964. paper $1.60.

This interesting account of corn culture among the upper Missouri Indians was first published in 1917. The 1964 reprint of the William H. Miner Co. edition was made possible by arrangement with the authors.

The book is dedicated to Mr. Will's father who recognized the value of the native varieties of corn in 1881, when he began then to select and breed from them "to the lasting benefit of the farmers of the Northwest."

THE THEORY OF THE GENE. Morgan, Thomas Hunt. 358 pages, indexed, bibliography. Hafner Publishing Co., New York, N. Y. 1964. $9.50.

This clear account of genetics, from the Silliman Memorial Lectures delivered at Yale University, was originally published in 1926, enlarged and revised in 1928. A second printing, made in 1929, was reprinted in 1964.

The author was honored in 1933 with the Nobel Prize for his discoveries relative to laws and mechanisms of heredity.

BOOK REVIEWS

THE INSECTS. Lanham, Url. 292 pages, illustrated, indexed. Columbia University Press, New York and London. 1964. $6.95.

In any field of endeavor, there is always room for another good book. This one makes it handily in the the field of entomology. Well written, and beautifully illustrated, it should appeal to the general reader and especially to students and teachers of entomology.

P. P. PIRONE

THE GARDENER'S BUG BOOK (3rd ed.). Westcott, Cynthia. 625 pages, illustrated, indexed. Doubleday & Co., Garden City, N. Y. 1964. $9.95.

All gardeners, whether amateur or professional, will welcome back this extremely useful and well-written book. The third edition is enlarged to include the latest information on the control of eighteen hundred pests. The full-color plates by Eva Melady, an excellent feature of the earlier editions, have been retained.

P. P. PIRONE

OCEAN SCIENCES. Captain E. John Long, U. S. Naval Reserve (Retired), ed. 304 + xii pages, illustrated, indexed. United States Naval Institute, Annapolis, Maryland. 1964. $10.00.

This is a book by a number of outstanding scientists interested in one aspect or another of oceanography. It is intended to give a summary of the endeavors presently considered of critical importance to those sciences dealing with the ocean.

In general, the chapters are separate essays written in an easy style, apparently for the intelligent lay public rather than for a group of oceanographers. Physical and biological oceanography are discussed as well as some of the implications of studies of oceanography for warfare and for the future economy.

There are three appendices, the first of which lists oceanographic institutions of the world and the second which lists oceanographic ships of the world. The third appendix is a U. S.-Metric Conversion Table. A glossary of a few oceanographic terms and a selected bibliography are appended.

The book is well written and well put together except for the drawings; it strikes this reviewer that a bit more care could have been employed in their preparation.

DAVID J. ROGERS

Please note that Book Service can accept orders only for books priced at more than one dollar because of publishers' regulations and requirements.

COMING EVENTS
at
THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500.)

ILLUSTRATED LECTURES, sponsored by the Advisory Volunteers of The New York Botanical Garden, at the French Institute Building, 22 East 60th Street, New York, N. Y., January 7, 14, 21, 28, 1965, at 11 a.m.

WINTER IDENTIFICATION OF TREES AND SHRUBS —10 a.m.-12 noon (8 weekly sessions). Starts January 9, 1965. Museum Building. Instructor —Mrs. Eleanor Yarrow.

CRYPTOGAMIC BOTANY—morning class, 10-11:30 evening class, 8-9:30 p.m. (8 weekly sessions). Starts January 11, 1965. Museum Building. Instructor—Dr. Clark T. Rogerson.

PLANT PESTS AND DISEASES—morning class, 10-11:30 a.m.; evening class, 8-9:30 p.m. (8 weekly sessions). Starts January 14, 1965, Museum Building. Instructor—Dr. P. P. Pirone.

HOUSE PLANT SHOW in the Conservatory—January 23-March 28, 1965. 10 a.m.-4 p.m.

"DEVIL MOUNTAIN LOST WORLD" (Venezuela), illustrated Saturday Afternoon Lecture by Dr. Julian A. Steyermark, on February 13, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

LANDSCAPE GARDENING (Spring Term, Section I) 8-10 p.m. (7 weekly sessions). Starts Tuesday, February 16, 1965. Instructors—Mr. Arthur Murphy and Mr. Ernest Altenheim.

IN-SERVICE COURSE FOR TEACHERS (Horticulture)—3:45-5:25 p.m. (15 weekly sessions). Starts Wednesday, February 17, 1965.—In Charge, Miss Elizabeth C. Hall.

LANDSCAPE GARDENING (Spring Term, Section II) 8-10 p.m. (7 weekly sessions). Starts Thursday, February 18, 1965. Instructors—Arthur Murphy and Ernest Altenheim.

"GLIMPSES OF PLANTS AND GARDENS OF JAPAN," illustrated Saturday Afternoon Lecture by Dr. Tetsuo Koyama, on February 20, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"ROCKY MOUNTAIN TUNDRA WILD FLOWERS," illustrated Saturday Afternoon Lecture by Mr. and Mrs. A. Clayton Scribner, on February 27, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"BERNADETTE'S COUNTRY AROUND LOURDES," illustrated Saturday Afternoon Lecture by Alice Dustan Kollar, on March 6, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

CHILDREN'S OUTDOOR GARDENCRAFT. 9:30 a.m. to 12 noon. Starts Saturday, March 6, 1965. —In Charge, Mrs. Lillian Weber.

SATURDAY AFTERNOON NATURE WALKS—1:30-3:00 p.m. Starting point, Museum Building. First walk—March 13, 1965. Leader, Mrs. Eleanor Yarrow.

"A BOTANIST IN YOUR GROCERY STORE," illustrated Saturday Afternoon Lecture by Dr. Richard A. Howard, on March 13, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"THE PEOPLE OF SOUTHEASTERN ASIA," illustrated Saturday Afternoon Lecture by J. A. Lukins, on March 20, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

HOW TO PRUNE—10-11:30 a.m. (3 weekly sessions). Starts March 24, 1965. Instructor—T. H. Everett.

"THE ART OF BONSAI," illustrated Saturday Afternoon Lecture with demonstration by Yuji Yoshimura, on March 27, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

Members' Evening, April 1, 1965, 8:30 p.m. in the Colonnades Ballroom, Essex House, 160 Central Park south, New York, N. Y.

Admission to Saturday Afternoon Lectures, 25 cents, free to members of the Garden (upon presentation of membership card).

Nature Walks, fee $1.00 per person.

For fees of the various courses, see the Educational Program.

NEWS, NOTES and COMMENTS

Activities of the Director and Staff. Dr. William C. Steere, Director, during the past two months attended the reception and luncheon of the Nutrition Foundation held in New York City; a meeting of the Board of Trustees of Biological Abstracts, of which he is president, in Philadelphia; a meeting of the Committee on Polar Research in Washington, D. C.; and addressed the annual meeting of the Advisory Volunteers of The New York Botanical Garden. From December 10-19, 1964, he engaged in a survey of bryophytes in Puerto Rico before a rain-forest radiation project is carried out under the auspices of the Puerto Rico Nuclear Center of the University of Puerto Rico, Rio Piedras, for the United States Atomic Energy Commission.

Dr. Steere, supported by the Office of Antarctic Programs of the National Science Foundation, will leave the latter part of January on an expedition to the McMurdo Sound area in the eastern region of Antarctica. Dr. Steere will be accompanied by Dr. S. W. Greene, Scientific Advisor to the British Antarctic Survey, who is collaborating with him on a bryophytic flora.

The beautiful Chrysanthemum Show, November, 1964, drew one of the largest attendance to the Conservatory in recent years.

Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research, attended the UNESCO Conference at São Paulo, Brazil, December 14-16, 1964, on a commission for the Flora Neotropica, and a meeting of the Association for Tropical Biology at Caracas, Venezuela, December 18-19, 1964.

Dr. Tetsuo Koyama, Associate Curator, gave a taxonomic seminar on "The Vegetation of the Sino-Japanese Floristic Region," with special reference to the Arctic-Tertiary Elements, at the Harvard University Herbarium, Cambridge, Massachusetts.

Dr. Harold W. Rickett, Senior Curator of Botany, spoke at the regional meeting of the Garden Club of America, held at Cooperstown,

New York, and at the Native Plant Symposium at the Garden, during October, and at the Men's Garden Club on November 6, 1964. Elsewhere in this issue appears Dr. Rickett's account of his "Summer, 1964," received too late for inclusion in the November-December, 1964, issue of *The Garden Journal.*

Dr. Rickett reports that the second proof of the color plates for the Wild Flower Books has been received, that the text of the first volume is ready for the printer, and that publication is expected late in 1965.

Dr. David J. Rogers, Curator of Quantitative Taxonomy, as previously reported, not only delivered a paper on "Recent Advances in Taximetrics—New Models for Taxonomic Procedures" in the Botanical Science Symposium entitled "Plant Biology Today; Advances and Challenges," but also a paper on "Manihot in New World Culture" in the Society for Economic Botany Symposium entitled "Integrated Research in Economic Botany VI; Ethnobotany of Some New World Cultures." Both symposia were held during the meetings of the American Association for the Advancement of Science in Montreal, Quebec, in December, 1964.

Dr. Michael Wirth and George Estabrook, also of the Department of Quantitative Taxonomy, jointly presented a paper on "A Nonstatistical Hierorchical Clustering Method" at the meetings of the Society of Systematic Zoology, held at Knoxville, Tennessee, December 28-30, 1964.

Mary Fleming, Technical Assistant in the Cryptogamic Herbarium, has been elected Vice President of the American Rock Garden Society; she recently lectured before the Tappan Zee Chapter of the Society. Mrs. Fleming also gave a lecture before the Great Neck Garden Club. Last fall, accompanied by her husband Henry, who is Research Associate in the Department of Quantitative Taxonomy, and her son William, she participated in the annual Charles Horton Peck Mycological Foray in Allegheny State Park, New York, and collected lichens.

Rupert C. Barneby, Honorary Curator of Western American Botany, spent five weeks the latter part of fall 1964 collecting in Mexico. Mr. Barneby's work on *Astragalus* was published by the Garden, under a grant from National Science Foundation, on December 28, 1964.

Above. At the reception tendered Mayor Wagner by the Advisory Volunteers at The New York Botanical Garden on October 15, 1964, the Mayor was greeted by Mrs. William C. Steere, wife of the Garden's Director, with Mrs. James C. Mackenzie, Chairman of the Advisory Volunteers, at her left and Mrs. Harold I. Pratt, a member of the Board of Managers at her right. Left. Dr. Steere, Director, and Charles B. Harding, President of The New York Botanical Garden, escorted the Mayor on his tour of the grounds.

Anniversary and Retirement Gifts were presented to several employees by Charles B. Harding, President of The New York Botanical Garden, at the annual Christmas Party on December 17, 1964. An anniversary gift was presented to Dr. Harold W. Rickett, Senior Curator of Botany, who has been a member of the staff for twenty-five years; and retirement gifts to Michael Kiely, who has been an employee since 1945, and to Helen Mooney, an employee since 1957.

A Series of Lectures is being given at eleven o'clock Thursday mornings during January by the Advisory Volunteers of The New York Botanical Garden in the French Institute at 22 East Sixtieth Street, New York. Dr. Harold W. Rickett, Senior Curator of Botany, will discuss "Wild Flowers of North America" on January 7; New York City Planning Commissioner Mrs. Randolph C. Guggenheimer, "Open Space Preservation in the Metropolitan Area" on January 14; Dr. Donald Wyman, Horticulturist of the Arnold Arboretum, "Low Maintenance Gardening" on January 21; and James Fanning, landscape architect, "Flowers of the Caribbean" on January 28, 1965.

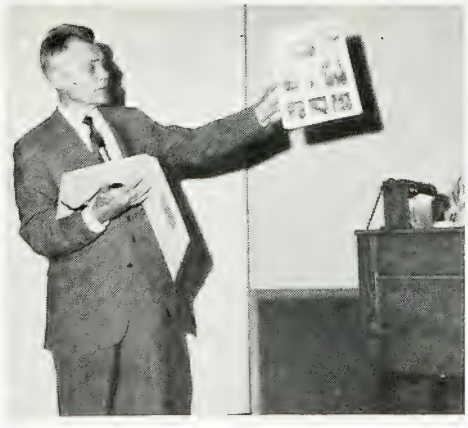
The lectures are open to the public at $8.00 for the series; $6.00 for Garden members.

Commemorative Program at the Garden. On November 22, 1964, in memory of the late President Kennedy, the Mosholu Unit of B'nai B'rith, planted a tree near the new gate of The New York Botanical Garden, opposite Fordham University. The tree, a dawn redwood, *Metasequoia glyptostroboides,* dates back, as T. H. Everett, Assistant Director (Horticulture), told the assembly filling the auditorium, to the age of fossils and was, until its discovery in China some twenty years ago, believed to be extinct.

Books were awarded by B'nai B'rith Mosholu Chapter to six outstanding trainee gardeners, from nearby Christopher Columbus High

Mrs. Wallace Sterling, right, wife of the President of Stanford University, and Mrs. John E. Lockwood, Vice Chairman of the Committee of the Native Plant Garden, before the exhibit of books on wild flowers displayed during the Symposium on Native Plants held at The New York Botanical Garden on October 28, 1964.

Dr. Harold W. Rickett, Senior Curator of Botany, showing colored proof of a plate in the Garden's Wild Flower Books after his talk on native plants during the symposium.



The symposium included a tour of the Native Plant Garden. Some twenty thousand plants native to the northeastern United States were planted there this spring. The garden is unique in that it has a "climate conditioner"—a mist system which purifies the air, raises the humidity, lowers the temperature, and reduces the intensity of the sun.

School, who are enrolled at the Garden—City Schools Cooperative Education Program, and a contribution was presented by B'nai B'rith Mosholu Lodge to be used in this work at the Garden.

Representatives of three faiths participated in the commemorative program; Rev. Gerard F. Fagan, Director of student personnel of Fordham University, Rev. William Kalaidjian of Bedford Park Congregational Church, and Rabbi Herschel Schacter of the Mosholu Jewish Center. Dr. William C. Steere, Director of The New York Botanical Garden, extended words of welcome. Borough of Bronx and New York City officials were seated on the dais.

Eugene Sugarman, Vice President of B'nai B'rith District #1 was the guest speaker, and Michael Tolan, star of stage, screen, and television, gave a dramatic reading. Colors were presented and taps played by the United States Army Corps of Officer Cadets of New York University, and the Bronx Junior High School Borough-Wide Chorus impressed everyone with their superb performance.

Another Summer of H. W. Rickett. I went first to Glasgow, then picked up a car and drove down to Yorkshire for a holiday. My cousin and I first tackled the Great Gable in the Lake District—where the Everest climbers and others do a bit of practice climbing. We got lost and found ourselves on the face in loose scree—managed to clamber up to safety. Came down a new way, also—could hardly walk next day, both being out of condition. Spent the ensuing week tramping the moors and climbing various small mountains. And photographing English wild flowers.

Then up to Edinburgh (it does *not* rhyme with Pittsburgh) and the Tenth International Botanical Congress. Here the Section on Nomenclature spent four painful days on very hard benches, debating hundreds of assorted proposals for changes in the rules. By great efforts we succeeded in keeping things substantially as in the present Code (like Alice through the Looking-Glass, who had to run very fast to stay in one place). The most significant achievement was the creation of a "Stabilization Committee," to supply or determine correct names for users of names who are not taxonomists; in short, to act as liaison between the layman and the specialist. Such information, as it accumulates, will be published and will remove uncertainty about correct names of economic plants, forest trees, etc.

In recognition of my own part in these matters, I was elected Chairman of the General Committee on Nomenclature, an honor I accepted only in the understanding that it entailed no duties and was in fact merely in recognition of my advanced age (the Secretary does all the work).

After the Congress (which was excellently organized and during which we enjoyed to the full the traditional hospitality of the Scot), I meandered southward, visiting various relatives and cathedrals, fetching up in Ipswich, where I worked for two days with the top experts of W. S. Cowell's, Ltd., who are doing the color printing and typesetting for the Wild Flower Books. We examined first proof of about three hundred and fifty pictures (sixty plates), often through a lens to determine register, comparing them with the original photographs, and ordering whatever retouching seemed necessary. This was a very rewarding and informative experience; everyone seemed pleased. I shall see second proof of every plate, and the remaining one hundred and twenty plates will be gone over in the same way. The hospitality of the people at Ipswich was also something to remember.

Finally up to London, with brief visits to Kew and the British Museum, and more old friends, and then a train to Glasgow. About six weeks in all.

Visitors to the Garden

Dr. Miguel Canela-Lazaro, Santo Domingo, (Rep. Dominicana).

Dr. Alfred E. Schuyler, Academy of Natural Sciences, Philadelphia.

Dr. and Mrs. Jose Cuatrecasas, National Museum, Smithsonian Institution, Washington, D.C.

Dr. and Mrs. John R. Reeder, Yale University, New Haven, Conn.

Gembong S. Tjitrosoepomo, Gadjah Mada University, Jogjakarta, Indonesia.

Dr. Edgar T. Wherry, University of Pennsylvania, Philadelphia.

Alan V. Mackay, Rio de Janeiro, Brazil.

C. G. Hunting, Rio de Janeiro, Brazil.

Dr. Philip Grant, National Science Foundation, Washington, D. C.

Dr. Christopher Martin, Institute of Marine Science, University of Miami, Fla.

Drs. W. I. Taylor and P. R. Ulshafer, Ciba Pharmaceutical Co., Summit, N. J.

Dr. D. Düvel, Staatsinstitute für Augewandte, Hamburg, Germany.

Dr. Walter Schubert and Katsumi Hata, Fordham University, New York, N. Y.

Dr. Michael Carlile, Imperial College, London, England.

John S. Michaeko, Cleveland, Ohio.

Dr. Hiroshi Inoue, National Science Museum, Tokyo, Japan, arrived in October and spent a month at the Garden, studying liverworts.

Large American Hollies. The very old American holly at New Bern, North Carolina, has a contender for first place as the largest specimen in the United States. A tree in Liberty, Texas, has been reported as having a circumference of thirteen and a half feet, a crown spread of sixty-one feet in diameter, and a crown height of fifty-three feet, according to C. R. Wolfe of Millville, N. J. Other reports of large, old trees have reached Mr. Wolfe, chairman of a special committee of the Holly Society of America, which is recording the sizes of old specimens of American holly, *Ilex opaca*.

A sizeable specimen in Conway County, Arkansas, measures almost fifty-one inches in diameter at four and a half feet above ground with

The Auditorium of the Museum Building was filled to capacity for the Kennedy Commemorative Program on November 24, 1964.

Left to right, Rev. William Kalaidjian, Minister of the Bedford Park Congregational Church; Mrs. Seymour Weinstein, President of Mosholu Chapter of B'nai B'rith; Joseph F. Periconi, President of the Borough of the Bronx; and Eugene Sugarman, Vice President of B'nai B'rith District #1, at the unveiling of the bronze plate in memory of John Fitzgerald Kennedy. The dawn redwood, just planted, in the background.

a circumference of thirteen feet, four inches, a height of sixty-eight feet, and a thirty-eight foot-spread. An American holly in Jefferson County, Arkansas, has a circumference of seven feet four inches, a height of fifty-seven feet, and a spread of thirty-five feet. In Hyattsville, Maryland, there is an old specimen whose trunk at four feet above ground is six feet, nine inches; its height is sixty feet and its branch-spread one hundred and forty feet. Horticulturists at the University of Maryland estimate this tree to be over two hundred years old.

Two hundred feet north of Indian Step Museum on the Susquehanna River in York County, Pennsylvania, is another large, old *Ilex opaca*. This tree is estimated to be about three hundred years old; its circumference at two feet above ground measures six feet, four inches, its height is fifty-two feet, and its branch-spread forty-five feet.

Donald A. Samson, Superintendent of Parks of Newport News, Virginia, informed Mr. Wolfe that in an isolated section of one of the city parks there stands an *Ilex opaca* with a diameter of two feet, four inches at four feet from the ground, a height of sixty feet, a spread of fifty feet, and a good crop of berries each year. The age of this holly is not known. However, several years ago, with the aid of magnifying glass, more than one hundred and ten growth rings were counted on a branch five inches in diameter. Steps have been taken to preserve the tree by annual feeding and mulching and by enclosing it within a five foot chain fence.

All-America Rose Selections of 1965 are 'Mister Lincoln', a fragrant, velvety red hybrid tea, and 'Camelot', an equally fragrant coral-pink grandiflora.

Fragrance in roses is being sought by the public, and hybridizers are taking this into account in their breeding programs. Fragrance is also a major consideration in the All-America Rose Selections judging program and played an important part in the choice of 'Mister Lincoln' and 'Camelot' as 1965 AARS winners. Plants will be available in limited quantities this fall for home gardens, but will be featured varieties next spring in nurseries across the country.

New Varieties for 1965 Gardens. W. Atlee Burpee Co. has added another All-America winner to its Zenith strain of zinnias, a F_1 hybrid, cactus-flowered group. 'Yellow Zinith' is the third of this strain to win an All-America award. Other Burpee introductions for 1965 are 'Sapphire', a mid-blue sweet pea of the Bijou-bush type; 'Hopeful', an almost-white marigold; and Early Bird asters, a strain which blooms two weeks in advance of most asters and which has a spreading, bushlike habit. Early Bird asters are available in separate colors of red, white, and blue or in mixed packets.

George W. Park Seed Co. is offering several new things; among them 'Summer Skies', the first F_1 hybrid ageratum to be introduced. The bushy plant, eight to ten inches high, bears a wealth of powder-blue flowers. 'Sunspot', a large F_1 marigold, has odorless foliage and its deep orange flowers are freely produced on vigorous plants three and a half feet tall. 'Melody', a free-blooming, double Grandiflora petunia, forms mounds of foliage which are almost concealed by the numerous, fringed, candy-pink flowers. Zinnia 'Daisy Mae', which has a charming old-fashioned look, is fine for cutting as well as for bed and border. The single, daisy-like flowers are an intense yellow.

A new everbearing raspberry, 'Fullred', is being offered for the first time this year; Kelly Bros. of Dansville, New York, are the introducers. It was originated by the late Prof. A. F. Yeager of the University of New Hampshire, who crossed the University's N.H. R-7 selection with N. Y.-287, one of Dr. George L. Slate's selections at the New York State Experiment Station in Geneva. Large, luscious, bright red berries may be expected the same year from plants set out this spring; these overwintered canes will bear a good crop the following June and will fruit again from mid-August until freezing weather.

Seventeenth-century Florilegia (picture books of garden flowers) and related paintings and prints are on display at the Hunt Botanical Library at Carnegie Institute of Technology until March 31, 1965. All the materials exhibited are from the Hunt Library's collection.

Spring Flower Shows. The dates of the International Flower Show in the Coliseum, New York City, are March 6-14, 1965; of the Spring Show of the Pennsylvania Horticultural Society, March 13-18, 1965, in the Armory of the First Troop, Philadelphia City Cavalry, 23rd and Ranstead Streets; of the New England Spring Flower Show, under the auspices of the Massachusetts Horticultural Society, March 13-21, 1965, at Wonderland Park, Revere Beach.

The Philadelphia Flower Show, customarily staged in the Commercial Museum, in which the Pennsylvania Horticultural Society has sponsored a section, is not scheduled for 1965 because of extensive renovations of the Commercial Museum.

The International Shade Tree Conference, at its annual meeting held in Houston, Texas, elected Joseph A. Dietrich, Superintendent of Parks of Greenwich, Connecticut, as president.

Among the awards presented were Author Citations to Richard R. Fenska of the F. A. Bartlett Tree Expert Company, Stamford, Connecticut, and Thomas Stevenson, Garden Editor of the Washington Post; Award of Merit to Homer L. Jacobs of The Holden Arboretum, Mentor, Ohio; Honorary Member Award to Henry J. Kohankie, of the Arnold Arboretum, Jamaica Plains, Massachusetts.

Halfred McKeever has been appointed Executive Vice President in charge of operations of the Bartlett Tree Experts, Stamford, Connecticut. Mr. McKeever, a management engineer and consultant, was associated with the firm of Bog, Allen, and Hamilton, Inc., for the past two years and previously served in a management consultant capacity in the sugar industry in Hawaii, the Phillippines, and Central America.

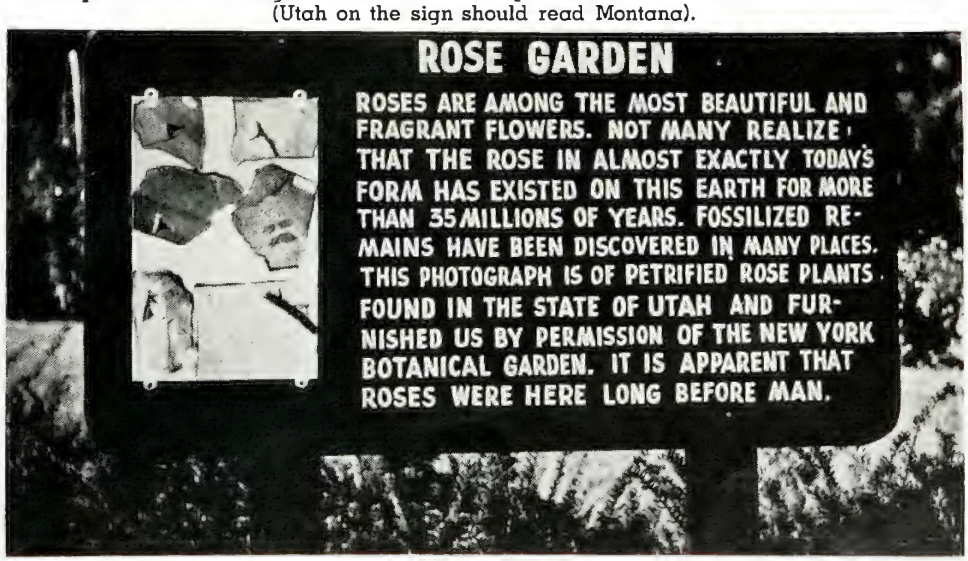
David Burpee, President of W. Atlee Burpee Co. since 1917 has been elected Chairman of the Board and David G. Cuthbertson, who has been regional manager of Pacific Coast operations, has been elected president.

Carl W. Buchheister, President of the National Audubon Society, has been elected chairman of the National Resources Council of America. The Council, composed of major national and regional conservation organizations, is a coordinating group; it was formed in 1947 to advance the attainment of sound management of natural resources in the public interest. The Council attempts to effect closer cooperation between member organizations in the attainment of common objectives, provide information on actions of Congress, the Executive and Administrative branches of the Federal Government, and other matters within the scope of mutual objectives, and to make available to member organizations scientific data and other information pertinent to conservation problems.

Dr. James G. Horsfall, Director of the Connecticut Agricultural Experiment Station, has received an honorary doctorate from Turin University. Dr. Horsfall, a distinguished plant pathologist, has spent the greater part of his career at the Connecticut Station; he was head of the Department of Plant Pathology and Botany for nine years before he became director in 1948.

On his return from Italy, Dr. Horsfall spent a month in Argentina, lecturing and conducting symposia on plant pathology and the administration of scientific research.

This sign, at the entrance to the Rose Garden of Sterling Forest, calls attention to the prehistoric origin of roses. The leaves and thorns are from photographs of actual fossil compressions from Oligocene sites of the Ruby River Basin in southwestern Montana. (Utah on the sign should read Montana).


ROSE GARDEN
ROSES ARE AMONG THE MOST BEAUTIFUL AND FRAGRANT FLOWERS. NOT MANY REALIZE THAT THE ROSE IN ALMOST EXACTLY TODAY'S FORM HAS EXISTED ON THIS EARTH FOR MORE THAN 35 MILLIONS OF YEARS. FOSSILIZED REMAINS HAVE BEEN DISCOVERED IN MANY PLACES. THIS PHOTOGRAPH IS OF PETRIFIED ROSE PLANTS FOUND IN THE STATE OF UTAH AND FURNISHED US BY PERMISSION OF THE NEW YORK BOTANICAL GARDEN. IT IS APPARENT THAT ROSES WERE HERE LONG BEFORE MAN.

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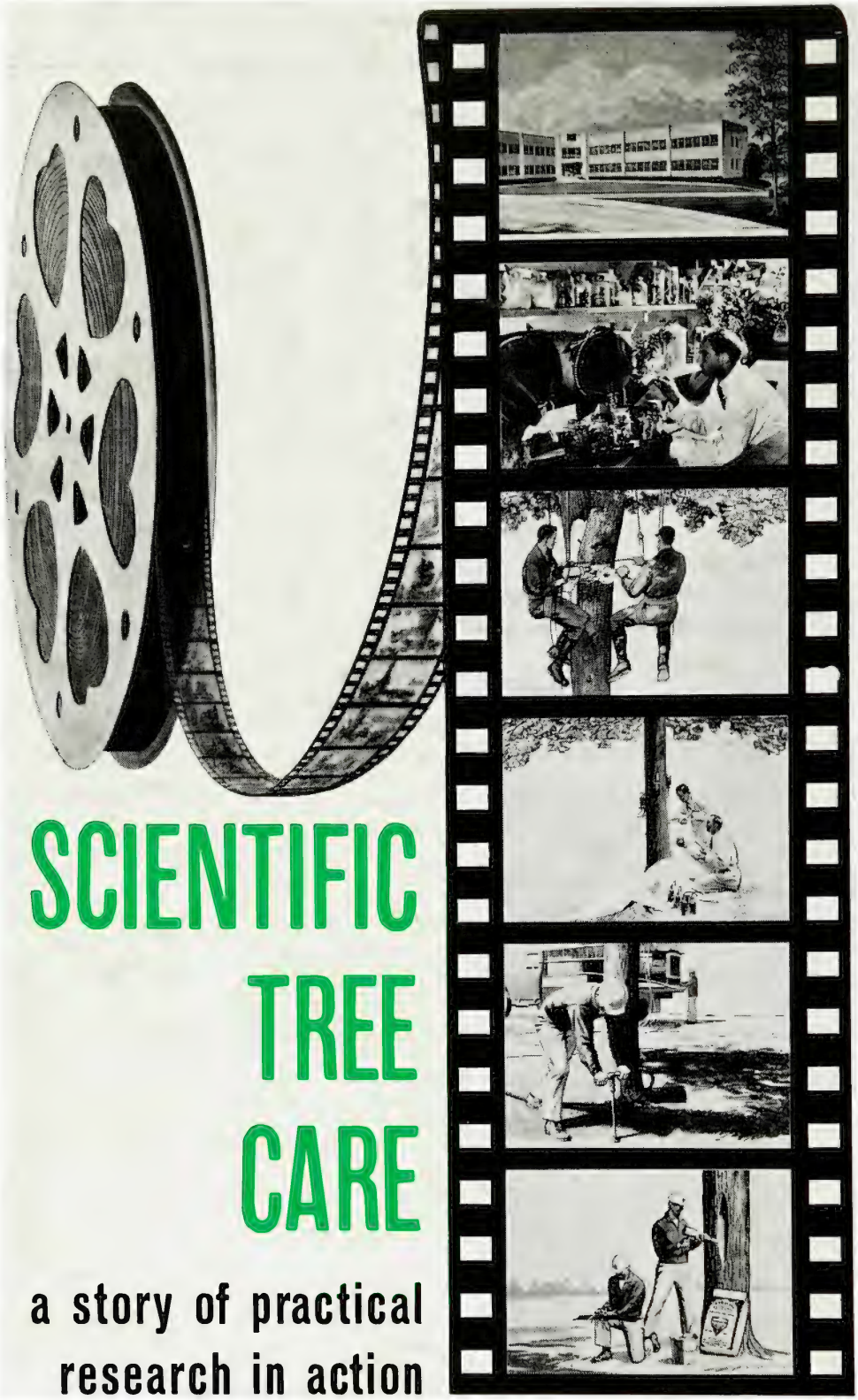
Children receive instruction, in a spring-through-late-autumn course, in Gardencraft during which they learn how to plant and tend garden plants. They may take home the produce they raise.

Through the Municipal Cooperative Education Program, Christopher Columbus High School students, in their junior and senior years, have the opportunity to become gardener-trainees at the Garden, attending classes and being employed in related jobs.

Illustrated lectures are given on certain Saturday afternoons from fall through spring in the Museum and Administration Building, and nature study walks around the grounds are conducted on Saturday afternoons.

A copy of the Educational Program and of the Saturday Afternoon Programs are obtainable from the Department of Education, The New York Botanical Garden, Bronx, New York 10458.



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Vol. 15, No. 2 March-April, 1965

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THE NEW YORK BOTANICAL GARDEN

invites you to join its

SPRING GARDEN TOUR

to

THE EASTERN SHORE OF THE HUDSON RIVER

May 6, 1965

"LYNDHURST" — A National Trust Restoration by bequest of the Duchess de Tallyrand, Tarrytown, N. Y.

Members of this Tour will be the first large group to visit Lyndhurst before it is opened to the public.

"BOSCOBEL" — An historic restoration of the 18th Century, Garrison-on-Hudson, New York.

"WHIP POOR WILL FARM"— Gardens of Mrs. Vanderbilt Webb, Peekskill, N.Y.

"STONECROP" — Gardens and House of Mr. and Mrs. Francis H. Cabot, Cold Spring, N. Y.

Luncheon will be served at Duchess Manor overlooking the Hudson River.

BUS SCHEDULE

Tour members can join the Tour at any one of the following three points:

8:15 A.M., promptly, buses leave 22 East 60th Street, New York City.

8:15 A.M.,, promptly, buses leave Main Gate, The New York Botanical Garden, Bronx, N. Y.

9:00 A.M., promptly, buses leave the Hilton Inn, Tarrytown, N. Y. which is just south of the east entrance of the Tappan Zee Bridge on Route 9.

We regret that no private cars will be allowed on the Tour.

All-inclusive tickets cover bus transportation, Restorations, houses, gardens and luncheon.

New York Botanical Garden Members $12.00

Non-Members $14.00

The slight increase in the price of tickets this year is necessary to defray part of the cost of admissions to Lyndhurst and Boscobel.

Send for details and tickets to:
The New York Botanical Garden
22 East 60th Street, N. Y. 10022

THE NEW YORK BOTANICAL GARDEN

Annual Meeting of the Corporation

May 3, 1965

All members of The New York Botanical Garden are cordially invited to attend the Annual Meeting of the Corporation at the Lorillard Snuff Mill at the Garden on Monday, May 3, 1965, at 2:30 p.m.

At this meeting, members of the Corporation, which is the parent body of the Garden, will elect members of the Board of Managers and will receive various reports on the Garden's activities. Distinguished Service Awards will also be presented at the meeting.

Formal notice of the meeting will be sent to all members of the Corporation, whose names appear below.

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W. Earle Andrews
Mrs. Montgomery B. Angell
Mrs. Harold E. Anthony
Mrs. Elliott Averett
Sherman Baldwin
Mrs. William Felton Barrett
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Mrs. Franklin B. Benkard
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THE GARDEN JOURNAL

DOROTHY EBEL HANSELL, *Editor*

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You can enjoy a free subscription to The Garden Journal *by becoming a member of The New York Botanical Garden. Write to the Membership Secretary, The New York Botanical Garden, Bronx, New York 10458, for information on the different classes and privileges of membership.*

CREDIT FOR ILLUSTRATIONS

Front-cover illustration—A Spring Sunday at The New York Botanical Garden by Walter Singer; pp. 42, 43, Centre Guatemalteco de Turismo, Cuidad de Guatemala; p. 45, lower, Phil Clark; p. 46, *Bulletin of the Fairchild Tropical Garden;* pp. 48, 50, 52, Pierre Dansereau; pp. 53, upper right 54, Marjorie Johnson Dietz—*Flower Grower, The Home Garden Magazine;* p. 54, lower, pp. 55-57, Esther Deutsch; pp. 58-64, T. H. Everett; p. 67, upper left and bottom right, Longwood Gardens, Kennett Square, Pa.; upper right, National Botanic Gardens, Kirstenbosch, South Africa; p. 68, Longwood Gardens, except center right, National Botanic Gardens, Kirstenbosch; pp. 69, 70, Thomas MacDougall; p. 71, Lincoln Adderley; p. 73, Vincent J. Boucher; pp. 76, 78, 79, Walter Singer; inside back cover, Helen D. Carswell.

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The Garden's Guatemala Tour

THE GARDEN'S GUATEMALA TOUR will be one of the most lovingly and carefully arranged tours ever. Not only are the professional skills of travel agencies in both countries employed, but people from The New York Botanical Garden and its women's organization, the Advisory Volunteers, are spending parts of their vacations on Guatemalan trips aimed at giving still more sparkle to the itinerary.

For example, I saw several proposed gardens during a trip in November, and decided to include two more in the Tour. And Mrs. Leighton H. Coleman, Mrs. Herman D. Ruhm, Jr., and Mrs. Charles L. Stillman, the Chairman and members of the Advisory Volunteers Committee on the Tour, spent two weeks in February visiting gardens and meeting with members of the Guatemala City Garden Club to discuss a tea or similar event to be given by that organization.

The fifteen-day Tour, October 22-November 6, will visit Guatemala City, Lake Atitlan, Solala, Santiago Atitlan, Chichicastenango, San Francisco el Alto, Quetzaltenango, Cocales near the Pacific, Antigua, Santiago Sacatepequez, and end at Guatemala City. Private homes, gardens, and estates, as well as coffee, rubber, and chocolate plantations will be viewed. For an extra charge, some of the group will fly to the rain forests surrounding the Mayan ruins of Tikal.

Charge for the Tour, all expenses, will be $1,198; this includes a $400 tax-exempt donation to The New York Botanical Garden. While primarily a tour for Garden members, attendance is also open to interested non-members. The Tour group will not exceed one hundred and ten persons, broken into two separately-routed parties.

Travel will be in cars, each driven by an English-speaking chauffeur-guide. Botanical experts will include Dr. William C. Steere, Director, and Dr. Pierre Dansereau, Assistant Director, of The New York Botanical Garden, Dr. Wilson Popenoe, horticulturist and plant explorer resident in Guatemala, Louis P Politi, the Garden's Horticulturist, and myself.

Further information may be obtained by writing: The Garden's Guatemala Tour, The New York Botanical Garden, Bronx, New York 10458. A detailed itinerary, of which reprints are available, appeared in the January-February, 1965, issue of THE GARDEN JOURNAL.

Recommended preparatory reading: FOUR KEYS TO GUATEMALA, by Vera Kelsey and Lilly de Jongh Osborne (Revised edition, 1961), $4.50. It may be ordered through the Garden's Book Service.

Phil Clark

Volcano-surrounded Lake Atitlán, queen of lakes, in Guatemala. The village at left is the Tzutuhil-speaking community of Panajachel, "place of the tree-killing vine."

ADVISORY VOLUNTEERS
OF
THE NEW YORK BOTANICAL GARDEN

March 6, 1965

Dear Members,

I am delighted to tell you about the wonderful Guatemala Tour arranged by The New York Botanical Garden. It will be for fifteen days, October 22nd to November 6th, this fall.

Guatemala is a fascinating place to visit since it is "unspoiled," with exciting Mayan ruins, beautiful Spanish colonial buildings, ancient handicrafts by the native Indians and flora unparalled in variety and beauty anywhere.

We are immensely fortunate that the Garden's Director, Dr. Steere, Dr. Dansereau and other authorities will introduce us to the botanical and horticultural joys. And we shall be guests at numerous private homes and gardens, too.

This will be, I know, an unforgettable and magic experience for all who join us. Please mail your application soon as only the first one hundred and ten can be accepted.

Sincerely yours,

Jane Coleman

Jane Fraser Coleman
(Mrs. Leighton H. Coleman)

Chairman, Guatemala Tour Committee,
Advisory Volunteers

INTERESTING INDIGENOUS FRUITS OF GUATEMALA

By Wilson Popenoe

Dr. Popenoe, at the age of twenty-one, joined the office of Foreign Seed and Plant Introduction of the United States Bureau of Plant Industry as a plant explorer under Dr. David Fairchild; he worked in Central and South America and Mexico for twelve years. Then he joined the United Fruit Company, moving to Honduras where he had the responsibility of setting up the Lancetilla Experiment Station. Later he became head of research for the company. In 1941 Dr. Popenoe was assigned the task of establishing the Pan American School of Agriculture, of which he became Director, then Director Emeritus.

Since his retirement Dr. Popenoe has been living in Antigua, Guatemala, continuing to maintain his interest in tropical and subtropical plants.

Honors bestowed upon him are numerous—doctor's degrees from the University of San Carlos, Peru, University of Guatemala, Pomona College, University of Florida, and medals from Chile, Ecuador, Honduras, France, Nicaragua, to mention only a few.

In 1963, he gave the first David Fairchild Lecture at the Fairchild Tropical Garden. And in writing about Dr. Popenoe, when the lecture was published in the July, 1963, issue of the *Fairchild Tropical Garden Bulletin,* Nixon Smiley said, "Like the man who gave him his first job, David Fairchild, he was blessed with a good mind and a magnetic personality. He is unsurpassed as a story-teller. Throughout most of his life he has been in demand as a speaker. . ."

Dr. Popenoe will be the featured speaker on the program for Members' Evening on April 1, 1965, and one of the experts on the Garden's Guatemala Tour.

High up in the mountains of central Guatemala (eight thousand to nine thousand feet), overlooking the valley of Tecpán, there grows a wild avocado which in all probability has been Guatemala's greatest contribution to horticulture. For this wild avocado, whose fruit is not as large as a tennis ball, has given through centuries of cultivation and selection of the best seedlings, varieties which sometimes weigh more than two pounds, which have relatively small seeds, and are of excellent quality.

Taken to other parts of the world and propagated by grafting, Guatemalan avocados have become of great commercial value, especially when hybridized naturally with avocados of the other two horticultural races, the Mexican and the so-called West Indian. The Mexican race, which withstands more cold than any other and has by some botanists been considered a distinct species (more commonly accepted as a geographical form of *Persea americana,* the botanical name for avocados in general), produces small, thin-skinned fruits of excellent quality. The Guatemalan race produces, in its present cultivated forms, larger fruits with thick, almost woody skins. It is slightly less cold-resistant than the Mexican. The West Indian race, wrongly so called because it was not known in the Islands until the early Spanish colonists took it there, is a tree of the hot lowlands, producing large fruits with thick skins like the Guatemalan, but of leathery rather than of almost woody texture.

The natural hybrids of these three races, most of which have been developed in California and Florida, now constitute by far the larger part of the world's commercial avocado production. This is largely due to the presence of Guatemalan "blood" in the hybrids.

In a very different part of the republic, climatologically, are to be seen two species of the family *Sapotaceae.* These are the sapodilla *(Achras sapota),* commonly known in Spanish as *chicozapote,* and the sapote proper, *Calocarpum mammosum.* It is worth mentioning that the Aztec people, who are responsible for these names in their original form, *tzicotzapotl* (gum zapote) in the first case and *tzapotl* in the second, had been working, before the Conquest, toward a rather practical classification of fruits and other plants. Soft, sweet fruits were called *tzapotl,* with a prefix (such as *tzico*) to specify just what kind of a *tzapotl* they were talking about, and *xocotl,* the more acid fruits.

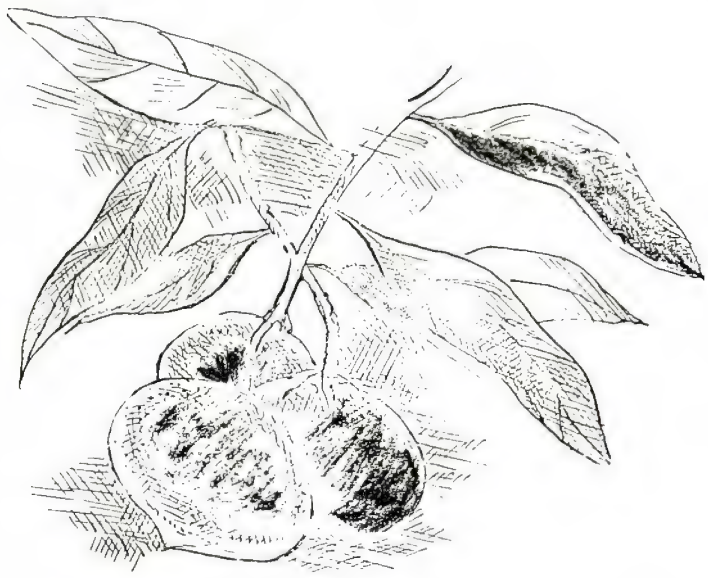
The sapodilla, or "gum zapote," is best known to North Americans because it was (formerly, at least) the main source of that solace of stenographers, chewing gum. Throughout the northern part of Guatemala (El Petén) it is a common tree, sought out by the chicle gatherers who, incidentally, discovered and brought to the light of archaeologists many important Mayan ruins.

But the round or oval, brown fruit, with sweet, soft flesh is really the important product of this tree, which was carried to India in the early days and has become important there as well as in many other parts of the tropical world. It has long been grown on the Florida Keys, where it has particular value because it resists hurricanes so well. It is a really delicious thing, if one likes very sweet fruits. One of the great British horticulturists wrote of it in India many years ago, "a more luscious, cool, and agreeable fruit is not to be met in this or perhaps any country in the world."

Many years ago, Cook and Collins of the United States Department of Agriculture wrote that the sapote or zapote, *Calocarpum mammosum,* was the fruit that sustained the Spanish soldiers on the historic and almost fatal march of Cortes through El Petén in 1524. I believe it is more probable that it was the sapodilla or chicozapote, because of its great abundance in the Petén and the productiveness of the tree.

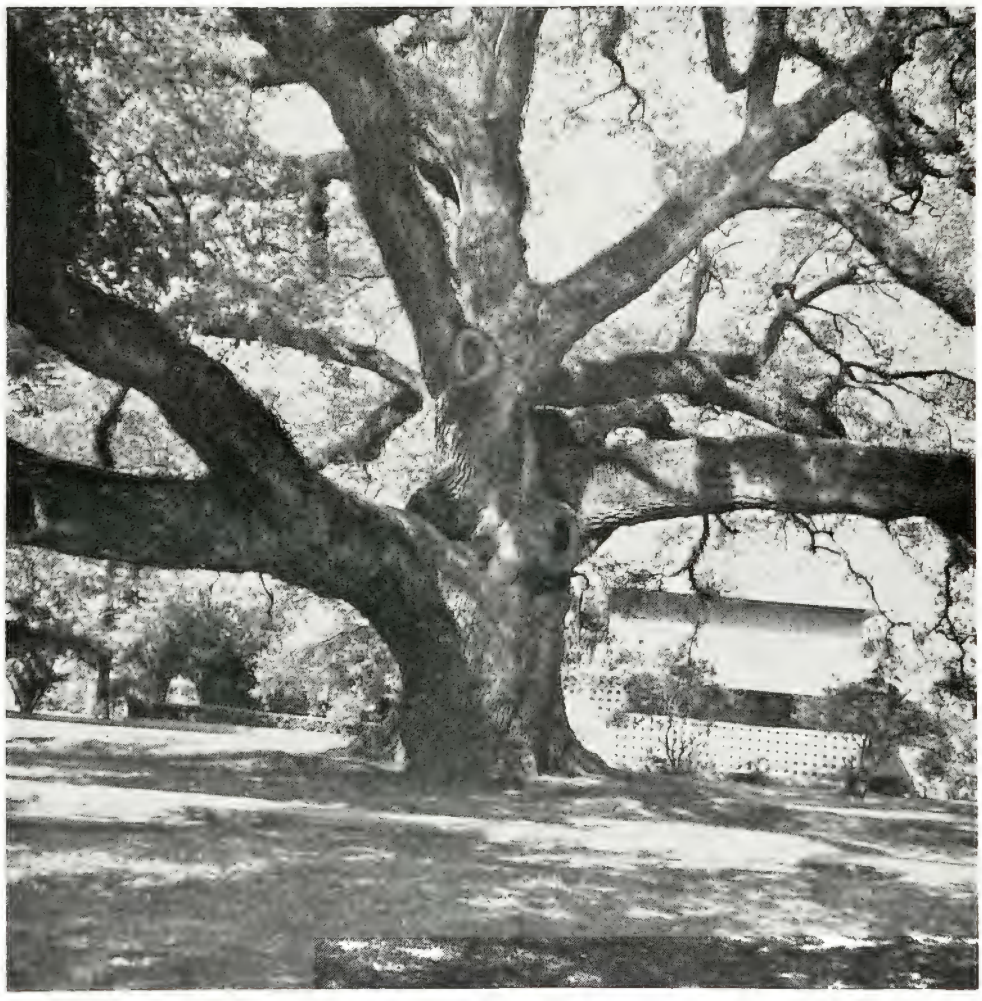
There is another *tzapotl* of interest, the *matasano* of the highlands, this is *Casimiroa edulis,* belonging to the Citrus Family, a fact which would not be guessed by anybody who was not an experienced taxonomic botanist. It is a fruit two to three inches in diameter, so soft and with such a thin skin that it does not withstand rough handling in transport

Casimora edulis, or *matasano*, of the highlands of Guatemala is also known as the white sapote. It is a member of the Citrus Family. From Phil Clark: *A Guide to Mexican Flora.*



Diospyros ebanaster bears the common name of black sapote, though no relative of the white sapote. Of the Ebony Family, it is a relative of the persimmon. From Phil Clark: *A Guide to Mexican Flora.*

Spondias purpurea, the jocote or Spanish-plum, belongs to the Cashew Family and is one of the trees most frequently seen in Antigua and Guatemala City.



or on the market. The flavor is thought by some to be rather mawkish. Its principal element is sweetness, so of course the Aztec classified it as a *tzapotl,* and to put it in its proper place it was *cochiztzapotl* (some of those Aztec names are a bit hard for a gringo to pronounce), which means "sleep-producing zapote." It was considered to be a soporific, and if any American race went into the medicinal value of plants and plant products, it certainly was the Aztec.

Not to drop these Aztec plants too suddenly, though I am talking, of course, about plants native to Guatemala, I mention the common jocote, or Spanish plum of the British, known in the Nahuatl or Aztec language simply as *xocotl* (the x has the sound of the Spanish j or the English h). It is one of the commonest trees around Guatemala City, Antigua, and other places between sea level and about six thousand feet. To see a spreading jocote tree loaded with its plumlike fruits is a sight never to be forgotten. Many kinds of jocotes are recognized, because vegetative propagation is practiced. This is so simple that limbs of jocote trees up to four or five inches thick are planted as fence posts, and they grow into fine, productive trees. Jocotes are commonly an inch long, but sometimes up to a couple of inches; they may be red or yellow in color. All have tremendous "stones" or seeds and very little flesh, which, however, is of pleasant subacid flavor something like that of the mango. Because of the facility with which this tree can be propagated vegetatively, it would be easy to develop varieties by selection of existing individuals which have more flesh and less seed.

In the highlands, at elevations between five thousand and six thousand feet, one often sees trellises covered with the handsome foliage of a broad-leaved vine. This is the granadilla, botanically *Passiflora ligularis.* One must be careful, if viewing it from a distance, not to confuse the vine with that of *Sechium edule* (*güisquil* in Guatemala, chayote in the southern United States). This particular passion-fruit, which is often seen in the markets, is the size of a large egg, orange or brownish in color, with a thin, brittle shell which encloses translucent, whitish pulp and what seems like a tremendous number of thin, black seeds, guaranteed not to cause appendicitis when swallowed. This simply must be true because most people swallow them.

In the highlands, mainly between five thousand and six thousand feet, one also sees another sapote. This time the green sapote, from the name *raxtul* in one of the indigenous languages. It is the *Calocarpum viride* of the taxonomists, a handsome large tree with dark green foliage and oval, usually pointed, brownish green fruits, containing sweet flesh and a large seed, sometimes two of them. It is really superior in flavor to the common sapote, *Calocarpum mammosum,* perhaps more like the sapodilla. Since it seems like a cross between these two, as far as flavor is concerned, it is known in Guatemala as *injerto*—a hybrid.

So far I have stuck religiously to fruits which are unquestionably native to Guatemala, which is not saying, of course, that they are not cultivated in other regions. But because of their interest it seems worth while to mention a few which may or may not be indigenous here. One of these is the *capulín* or *cereza* (cherry) which is abundant in the highlands. This is generally considered to be a southern form of the northern choke cherry, *Prunus serotina,* which occurs as far south as Mexico and perhaps into Guatemala, unless it

Dr. Paul Popenoe and Dr. Wilson Popenoe, right, discuss the flowers of the lychee, *Litchi chinensis.*

was brought here from Mexico in early days. It is a rather small cherry—there are much larger and finer ones in Ecuador—but of good, though mild flavor.

The manzanilla, another rosaceous fruit, is botanically somewhat hard to name with confidence, though it is a species of *Crataegus,* the genus which gives us those taxonomically terrifying hawthorns of the United States. Around Christmas time houses are decorated with garlands of manzanillas—fruits an inch in diameter and orange-yellow in color, very pretty. Much use is made of them for jellies, also for dessert when stewed in syrup. This is a native tree.

The annonas deserve a word, even though the best ones are not native to Guatemala with the possible exception of *Annona squamosa.* The cherimoya, here called *anona,* is a delicious dessert fruit, when chilled just about as good as pineapple ice cream. And the *guanábana (Annona muricata),* probably from the West Indies, makes an absolutely delicious ice cream.

From FOUR KEYS TO GUATEMALA.

"In recent years the restoration of old colonial homes has added to the charm and interest of Antigua. Of these, the first and most widely known is the Popenoe House. Built in 1634 by don Luis de las Infantes Mendoza y Venegas, Justice of the Supreme Court of the Kingdom of Guatemala, situated on the Street of the Nobility, it passed through many hands until acquired by Dorothy and Wilson Popenoe. It is an impressive structure, Renaissance-Moorish in style, with vast rooms (the sala or reception room is 90 by 92 feet) and several patios. In addition to its restored walls and colonial furnishing, one of the patios is devoted to orchid culture, and some varieties are in blossom in all seasons. In the sala is a collection of portraits by colonial and modern artists of personages who contributed to the history of Antigua and the house itself. Towering above the roofs is the Capuchin cypress, planted in 1850, from which the house derives its local name, Casa del Capuchino."

ITER AZORICUM

By PIERRE DANSEREAU

Dr. Dansereau is Assistant Director (Botany) of The New York Botanical Garden.

Continued from January-February, 1965

640523.—SANTA MARIA—TERCEIRA

We are accompanied to the airport by Sr. Pombo and by the Presidente. The flight to Terceira, in a small two-engine plane which seats eight, is very smooth indeed. We come down into the vast, impressive United States Army airport at Lajes, with its enormous, thick, transport planes. Colonel Agostinho is there to welcome us, as well as Sr. engenheiro Fagundes, and his wife, and also Sr. Magalhães, a professor of English and principal of the high school in Angra, a friend of the Pintos. Sr. Bento Rainha, who is going to be in charge of the plant collections, is also there; so that our expedition has now attained full force. Rainha has already done a goodly amount of collecting in the week or so he has been here. We unload and take off for Angra, on the south side of the island.

Françoise and I ride in a *Junta Geral* (district administration) car with Colonel Agostinho. The old gentleman (seventy-eight years of age) is as spry as ever, as precise in his language, as straight in his discipline, and as urbane. He is a well of information, meteorological, sociological, agricultural. No book has been written on the Azores (which I have seen) which does not acknowledge him as a major source of information. Such encyclopedists do not write books, unfortunately, and the Colonel will probably not set himself the task of producing the "definitive" book on his (yes, his!) islands. Among other things: he has made a complete translation of "Faust" from the German (some may call this dilettantism? it was hard work! so many hours a day, very steadily for months!). I know he will be, as in the past, most generous in allowing us all the brain-picking we are capable of. And right now is the time to start.

The Island of Terceira is as pleasant as I remembered it. In the late-morning light, the little white houses gleam and cast their short shadows upon the fields. We stop above Porto Martins to view the contrast between the more recent lava flow, a long black strip dotted with vineyards, and the surrounding fields, red where ploughed and recently sown or planted, solid green where the corn or wheat has risen. We also wind through the streets of São Sebastião to look at the church, small, squat with its lava blocks in the corners and framing doors and windows and steeple.

This over-populated island (70,000 for 396.75 square kilometers.) has a small economy: 2.5 hectares per family, 4-5 cows; they sell milk and livestock. Mere subsistence. Here the houses not always as neat as they are in Santa Maria, although almost all are covered with mortar and whitewashed. They are flanked by a *burra de milho* (a wooden structure on which corn is set to dry), some chickens are meagerly pecking at stray grains in an enclosure; a few pigeons flit around.

American influence? The Lajes airport occupies once fertile land, in fact the best wheat-producing area in the Island (it was then called Ramo Grande). There are some four thousand United States personnel here at present. Their Azorean employees, however, are mostly from other islands. An interesting item: contribution of emigrated Azoreans to the economy: in one year, twelve million escudos worth of used clothing and actual money were poured into Faial.

The Colonel has much to say on the variety of temperament among the islanders and the names given to them. *Terceira:* "rabo torto" because of the twisted tail of some of their dogs. They are very independent and proud people (as are those of Faial); maybe a little indolent. They will not live above three hundred meters: too much fog; some attempts were made; houses now abandoned. *São Miguel:* "alma de pau" because of the (Dutch) habit of tying cows to a peg. They are industrious and make excellent servants (maybe because, as in São Jorge, they have a long history of subjection to landowners). Both of these islands still have latifundia. *Santa Maria* people are called "cagarros" for the shearwater which is abundant there! The people of *São Jorge* are called "inhameiros" because they grow the yam *(Colocasia esculenta).* Corvo has the highest literacy; its people devour books. The Colonel is always sending them some. The people of *Flores* (according to the colonel) are the most intelligent. The emigrated bank managers and such in the U.S.A. and elsewhere are from Flores. The people of *Pico* are "tumeiros" because they raise sheep. Those of *Graciosa* are called "tinhosos" because they are bald! And those of *Faial* "tarraços" because they drink! This reminds me of the many flattering and mostly unflattering adjectives which the Swiss of the various cantons bestow upon each other.

The question of the Flemish migration to these islands, about which one hears so much, is interpreted by the Colonel. They were from areas then economically depressed, and the King of Spain took pity upon them and allowed them to settle here. They came to the Azores very much in the spirit in which Azoreans now migrate to Canada and the United States, with every wish to become assimilated. And this they did very rapidly. There is virtually no "Flemish influence." Nor indeed any French influence upon the language, as has been well demonstrated by a Harvard linguist of Azorean descent, Professor Francis Mallet Rogers, who has made a study of the Portuguese dialects. He found no speech peculiarities here which could not be traced to a continental Portuguese province.

After a short visit to the *Estação Agraria,* we are unloaded at the Pensão Lisbôa, of which I had such glowing memories. We are lodged in the "principal" building, above the Beira-Mar café, a two-story building, gleaming white, with a terrace above a praça and the winding rampart which hems in the bay. From our corner room, we look down upon the round mosaic which underlies a hackberry *(Celtis australis).* To our right, the Monte Brasil with its planted maritime pine forest lies beyond the great upsweep

of the white rampart with its cobbled street and dignified, balconied, low, white houses. A small, dark brown, sandy beach is swept by a gently lapping wave, where barefoot boys are kicking a ball, while labourers are suspended on platforms, whitewashing the walls. There are ships in the harbour to our left and launches busily loading and unloading. (A Russian ship was here in 1960, I remember.) Our room is large, spotless white, with a massive mirrored closet, an immaculate rococo tin washstand and two large, slender jugs. There are two bathrooms, one with hot water. Our servant is a bumbling little man, cheerful and efficient.

The food is quite as good as I remembered it. Octopus for my first meal and some excellent Calheta wine. After a short stroll in the busy streets we go back to the Estação Agraria for an indoctrination session. It is quite easy to explain to Colonel Agostinho our floristic, ecological, and conservation purposes. Senhor Fernando Cordeniz Fagundes, Director of the Estação Agraria, whom I had also previously met, made excellent arrangements for us. We have a study room, a large working room where Rainha has already piled up presses and specimens, and two auxiliaries to help in the processing. It seems that we shall also have transportation for all of our excursions.

640524.

Golden bars of sun before I wake. White lace breathing in the morning air. Sound of heels upon the mosaic. All gold and white and soon the dark blue surf upon the sand of sleep, breaking. Bursting is the day, a flower in my hand, a spring of limbs as I land into this Sunday morning. Now with all windows open, all sounds and smells freed into our consciousness, coffee and bread in our room.

Victor Magalhães calls at 11 and we are off to Biscoitos. Two cars, with the Magalhães family complete: his mother, a gently humourous and lively lady, his pert and pretty wife, Eugénia, her cousin Linda, a Titian blonde, and Paulinho, age three, a cherub who is everywhere at once, now immaculate but soon to take on the colours of the walls, the gardens, the pavements, the lava, the soil, and the grapes. Magalhães is in his early thirties, speaks an excellent English, with more of a British than an American accent. He is pure Portuguese in his culture, but a redhead (Flemish influence) and more precise than suave. He really defeats the "Latin" stereotype!

We drive up over the low top of Terceira, see the "brave bulls" (no! *touros bravos* means wild bulls!) in their pastures and stone enclosures where they are to be herded for the *touradas*. It is a delight to see again the *misterio* of Malha Grande, that vast broken pavement of lava where every rugged tile is finely furred with silver lichens, every

14. Badly eroded pastures on the soft *bagacina soil*. Ravine erosion in the background. Fajãs (Terceira).

15. Laurel—juniper—heath scrub on hillside in Fajãs (Terceira).

16. Dense, tall scrub of laurel, juniper, and heather in foreground, at Terra Brava. Pico do Boi in background, where ploughed land shows drainageways (Terceira).

17. Extensive bog at Terra Brava, showing low moss and sedge phase in foreground and heath scrub in background (Terceira).

interstice alive with translucent ferns, and the larger pockets of soil yielding a broomlike, yellowish heath or a twisted blue juniper.

Downhill towards Biscoitos through planted forests (including a few walnut trees). The land around and below the town is all vineyard, the leaves ever-so-green against the firm but delicate lava walls enclosing them. Down to the seashore in a tumultuous hardened foam of basalt with ledges, cornices, lagoons, and pools. A few young men in sinister Martian black rubber are spear-fishing. John and I a little melancholy that we are not allowed to strip and jump in. But there are other good things ahead.

Indeed the celebration of the Holy Ghost (the *Imperio*) is in full swing on this Sunday of the Trinity. A golden bird of no species hovers in joy and strength above this milling crowd. (Sir Julian, maybe you would not like this. I remember my ride through the countryside with you near Manila and you scoffed: "This disgusting pullulation"!) It is not too easy to make our way in the street, to get really near the centre, until one of the town notables invites us to his veranda overlooking the proceedings. We are quite close to the tiny chapel where lies the centre of the ceremony. Every village has one and they are all rather ugly kiosks, painted in as many colours as possible, as unthinkingly Italian as the old churches are forbiddingly Iberic. Although a priest is seen on the premises, the whole *Imperio* (distribution of bread and wine to the people) is in the hands of laymen, who work hard (baking, giving wine from their private supplies, catering, decorating). There seems to be ill-feeling right now in some parishes, where the clergy want to repatriate the feast into the church. This can only be a question of money, because the proceedings are as dignified as can be. After the procession from the church has reached the auxiliary chapel and the little girls in white are finally permitted to titter and giggle, the distribution begins.

Wearing their only pair of shoes, their only black suit, many red-necked and coarse-handed men solemnly hand out huge loaves of bread (of which we each get one) and pour wine endlessly (of which we drink liberally). It is good, substantial crusted wheat bread, and the wine is "Americano" (i.e., from *Vitis labrusca* vines!). The sun is on and off and we are even showered by a thin pelting rain. Water from the sky, soaking the red earth. Red blood of these unanimous bodies and red wine in the cups and on the lips. Smile of agape and the golden bird will perch on every shoulder and the hard rays will pierce every heart.

Mischievous boys, cynical taxi drivers, old women in black shawls, young matrons in prints: give.

We circle the western half of the island and the Sunday crowd is everywhere. And again we have wine and bread in a much smaller town, Doze Ribeiras, with only a few dozen people attending. Wine is poured directly out of a large barrel on the dusty *praça.* Hackberry trees neatly trimmed, yellow and white houses, and backyards with the corn stacks (burras de milho) towering, the cocks crowing. More wine, more sun, more conversation. Why should they love us?

At Angra, I feel quite tired, having gotten in and out of the car all day. John and I frantically photographed windmills, gardens, vineyards, people. I should go straight to bed. But instead, to 7 o'clock mass in a small parochial church, São Pedro. Coming out refreshed, we stop in at a neighbourhood fair, carried by a flowing crowd towards a band in a bandstand loudly playing. (Instead of the *fados* which John is craving!) There are various "attractions" as well. One of them is a running lottery: sticks with painted numbers on them are sold at one escudo each. The winner gets a bottle of wine or ten chocolate bars. Françoise loves lotteries and urges me to try. I buy two. And win! Here I am with ten chocolate bars brandished high over my head. It is quite evident that I do not want chocolate for myself, having long passed the age of ten. But there are more than ten boys and girls of that age around me—a bouquet of eager and variously scrambled faces and outstretched hands. It is soon done and I regain my anonymity, and the sound of our heels on the cobblestones of the dark side street replaces the blare of the band.

640525.

A fine day for our first major excursion on this island, with Fagundes. We go to the Terra Brava area by jeep, and walk several miles through a pasture project, some natural scrub, a long bog, and various pastured fields and ravines.

The consolidated volcanic ash known as *bagacina* forms a friable conglomerate-like structure which is easily altered where exposed, either by cuts or by surface erosion. It also dries readily at the surface and blows away. It is very tricky to handle. Where it has been completely stripped of all vegetation, ploughed (and quite possibly bulldozed!) it washes away in sheets and overwhelms well-consolidated down-slope vegetation (e.g., short-grass pasture). Much of the gravel is a very light pumice, which can, of course, float as well as drift! This reminds me of the Tongariro subalpine level in New Zealand where the already (climatically) sparse vegetation was visibly abraded by the floating pumice drift. Nothing like that here, however. Bird's-foot trefoil *(Lotus pedunculatus)* has been sown, as it seems, without much success. It is pathetic to see the mangled fronds of Culcita which persist here and there. (The russet "down" at the base of these fronds was once used to make pillows.) A few suckers of other woody plants also persist *(Vaccinium, Erica, Calluna),* but mostly a weedy-looking rush and tufts of the ubiquitous *Agrostis castellana* are the most visible signs of life. The potential of the bagacina is certainly not all that low. Witness the rather massive scrub of *Erica-Laurus-Juniperus-Myrsine-Vaccinium,* with its lush ferns and abundant moss cover where there has been no recent disturbance. Quite possibly a strictly-contoured pasture consisting of strips separated by a natural hedge of this scrub would be better.

The vegetation on the basalt and other solid volcanic rock is not floristically different, although it seems to be at first sight. Since it is much more difficult to manage, no actual ploughing is to be envisaged on this tumble of huge rocks and naturally-quarried stones. For all the world like a glacial moraine. A wondrous complex of suspended pits of soil, some of it very mature indeed. The architecture of these blocks resting upon each other must be periodically upset by earth tremors (not rare in these islands) and by minor effects of silting and weathering and of slip and gravity, not to mention percolation. Only frost is not in-

18. Effect of burn on right; intact laurel scrub on left. Val Fundo (Terceira).

19. Floating mat of *Sphagnum* bordered, in the ditch, with *Juncus effusus*. Terreiros do Carvão (Terceira).

volved here. The rooting level of a dense laurel scrub is staggered over the broken carpet of mosses and ferns which tends to envelop, to overwhelm every rocky surface. The sphagnum forms huge hanging cushions, only slightly dried at the surface. There must be a number of empty chambers beneath the surface of this suspended soil, for the larger blocks where they meet have cavernous gaps and are plastered with dark green liverworts and *Selaginella.* The latter curls up towards the light.

The sun beats and the leaf of the laurel pulsates and minutely churns its sweet spices. The blueberry unfolds tender, red leaves which expand to green. The lustrous ferns plunge their fibrous ebony roots below the rocks into the cold earth and their rusty scales crackle as their fronds unroll their tips and flatten out their blades. The sphagnum has soaked in the fog of days and days and now steams in the noonday air and turns from green to yellow. What unwelcome beast am I, my foot toppling stones, crushing a lichen polster, belly and thigh scraping the delicately poised moss, studded with the yellow stars of loosestrife and cinquefoil. My hand is more sensitive maybe to the touch of the tiny, epiphytic, filmy fern, its ghostly blade repeated hundreds of times in the furry sheath of feather-mosses which envelops every bough. This is a sort of possession: the grasp of branches of all textures, the brush against my skin of brittle laurel leaf, or harsh prickly heather, of scratching madder and thorn, of caressing fern, and stiff spike-rush. But above all, the yielding moss suddenly cold beneath the surface but warm on the higher rocks and trunks.

There has been little interference here, only the occasional cutting of a juniper. Why is there nothing beyond scrub? Why is there nothing taller than five to seven meters? Cannot *Laurus azorica* reach the same dimensions as *Laurus canariensis? Ilex perado* ssp. *azorica* as *Ilex perado* ssp. *platyphylla?* Or *Juniperus brevifolia* be as big as its vicariant *(Juniperus cedrus)* has become in the Canaries? Or *Notelaea azorica* as tall as *N. excelsa?* Have the Azores truly a shrub climax? And this even in the lowlands? This wet, mild climate is a forest climate! Witness the great stands of *Cryptomeria, Eucalyptus, Acacia.* Witness also that in New Zealand, under even colder conditions, but on a very similar substratum (physically and chemically), equally slow-growing native species do form a forest. Guppy's statement that the "soils are inadequate" is not convincing to me. Are we to believe that former conditions (of Fuegian climate) have irreversibly dwarfed all these species whose Madeiran and Canarian nearest relatives have remained tall? Can it be that man has had some influence, in his very brief contact of a few hundred years, in selecting out all the tall timber? He has destroyed, or so it seems, all vestige of *Taxus baccata* and *Persea indica.* But can he, as I have hypothesized in the Mediterranean in the case of *Quercus ilex,* have gradually eliminated most of the tall-growing genotypes?

Having persuaded our guides that we wanted to see tall laurels, we were shown some which attain seven meters—none which are high enough to be trees according to my definition. This stand, also undisturbed, is on the edge of a very steep hill, the trees spread out as they do in Madeira, perpendicular to the slope, although junipers, heathers, and laurels do this very much more than pau-branco *(Notelaea azorica)* and holly *(Ilex perado* ssp. *azorica)* which tend to be quite erect. Also blueberry *(Vaccinium cylindraceum).*

Below this hill is a closed basin and a peat bog of considerable dimensions. The accumulation of organic matter reaches about a meter. The sphagnum carpet is continuous and it tends to form hummocks, on which *Polytrichum* (of the *commune* group) becomes established, and eventually *Calluna vulgaris, Erica azorica,* and *Juniperus brevifolia.* This consolidates into rather a thick bog scrub, with outstanding *Erica,* three meters high. Would it normally go on to a juniper scrub were not the latter exploited? Later on we came upon a small bog lake of the classical textbook pattern, with a pond in the centre, a floating mat (too soft to hold my weight and it is too late and too cold to take off my clothes and jump into it). There is not even *Potamogeton* or *Callitriche* in the very shallow pond, only *Eleocharis.* From this to *Sphagnum—Eleocharis* to *Sphagnum—Polytrichum—Erica.* A ditch surrounds the pond with tall *Juncus effusus.*

Fagundes has brought with him two 17-year-old apprentices, two slight but wiry boys, respectful and mocking, solemn and playful. At lunch time they grab handsful of

sphagnum and throw it at each other as we do snowballs, and run and stuff each other's shirt. It does me good to see young people in this explosive mood, for the Portuguese often seem a little too mild to me.

Evening with the Magalhães': a leisurely walk up to the café opposite the cathedral. Egg-and-sugar *doces* in the Iberian tradition (one of the specialties which Françoise and I have decidedly not taken to). Conversation continues multilingual. In Portuguese: Antonio, Quitéria, the Magalhães and me; in French, Françoise, the Pinto's and me; in Spanish, John and Antonio; in English: all *mais ou menos.* At the end of a busy day, a kaleidoscopic headache.

640526.

Really the first easy day, the first day of partial leisure or at least of unplanned work. Only then can I write at all beyond just note-taking and note explicitating. And maybe turn my thoughts to speculation.

Having written and worked on notes and maps all day, John and I take off in a taxi for São Sebastião to see a tourada. The Portuguese do not kill the bull, and this has many implications. First of all, the same bull will serve in many rounds, may last several years, and quite possibly a wise bull is more dangerous, knows the tricks. The Terceira version of a bullfight, now being enacted all over the island in one village after another, consists in tying the bull to a very long cable held by four to six men, who variously follow and restrain him.

We approach São Sebastião through back streets and find ourselves high on the edge of a walled potato field. I seem to be standing too close to a pretty girl and our taxi driver warns me to step slightly to one side. But maybe this will be forgotten when the excitement begins? We are looking down into a trapezoidal praça, very narrow at one open end which leads to an uphill street. The other end is barricaded with plank palisades. Two other streets open into the praça. The bulls are in hermetic wooden pens and can be heard stomping. The black lava walls of the gardens, the doors, the windows, the balconies, the palisades are all strung with people. (No, this is not for Breughel like the crowd in Accra in 1957! These people are less boisterous, their abiding gravity still shows: more about this later.) Small boys (whose weight will not break the brittle tiles) are on the roofs. Or in the trees. Vendors weave through the crowd, selling popcorn, lupine, and pumpkin seed, peanuts, sticky candy and chocolate. Some of the middle-aged men are wearing their good clothes, but no shoes; the young girls, bright prints. The young men look poised and patient.

What a fine beast is the bull liberated: shining black with white horns curved forward, his whole weight in his chest, his strength in those thin loins and hind legs. When he breathes down into the dust and scratches the soil, the great curve of his neck and shoulders is arched in anger. And then he looks up into the cheering and jeering faces, drunk with the noise, and he trots off in sheer elegance, in an ecstacy of movement. The restraining crew (pastors in flowing white shirt, almost like a surplice) give him plenty of rope, running behind him, nimbly jumping to the top of a garden wall if he retraces his steps, pulling in unison when he has run too far into the side-street or the top-street.

And now the dashing young men. They run across his path, having jumped out of a window, they rush up a wall or plunge into an open door. Some run diagonally, some directly in front of the bull, provoking him with cries. One barefoot fellow is very daring, gets quite close, twists and turns and successfully deceives the beast into making many false movements. The crowd approves by shouting. There must be someone for whom this is put on. He is not so young and indeed the adolescents and men in their early twenties all seem to stand by. Why?

640527.

Wearing our best clothes, ties, polished shoes, we pay our respects to the *Governador* of the district of Angra (which comprises Terceira, Graciosa, and São Jorge). He receives us in a great ceremonial room hung with paintings of famous statesmen. He is a cordial and pleasant man whose dignity does not incline to stuffiness.

The rest of the afternoon is spent with our beloved Colonel Agostinho. We drive up to Cabrito and the Caldeira de Guilherme Moniz, look into the mouth of the furna and turn down at Bagacina to finally take a walk down a long path that extends from 390 meters down to 200 and lower. The Colonel wants us to witness the disappearance of *Notelaea, Calluna* at 300 meters and the diminished vitality of laurel, with only a few persisting at 240 meters. He has actually grown *Laurus azorica* near sea level and it has not flowered. On the other hand, the introduced *Solanum auriculatum* from 300 meters downwards grows to seven or eight meters, has beautiful foliage and flowers!

This whole area of Veredas is abundantly planted to tall-growing *Cryptomeria japonica* and *Eucalyptus globulus.* Again here the problem of naturalization: does it? John and I uproot three seedlings 40-150 centimeters high. Definitely not sprouts, they occupy a haphazard position. They *look* spontaneous!

Late afternoon finds us winding down the streets of villages in the suburbs of Angra. There are many beautiful homes in gardens enclosed by high walls, shaded by tall *Metrosideros,* dominated by towering *Araucaria.* Some of them belong to doctors—a lucrative profession here, says the Colonel. The Jesuits (expelled by the Marquês de Pombal) used to have a college here.

At dusk we are by the sea, where a gray wind sweeps the sky above us with only a golden arrow now and then. The old church of São Mateus on its promontory is gradually crumbling in abandon. Its stones, one by one reverting to the ambient lava of the land, but its structure still noble, window like a hollow eye, arch like a broken rib, door like a muted mouth. The anguish of the gulls stridently wails as they circle around us. The wind harshly combs the yellow grass and curbs the stems of the bright orange marigolds. As the population shifted from agriculture to fishing, it moved down to the bay where all the houses are now, and the new church, very neat, white and black, its glass intact, its door freshly painted.

640528.

Weather most unpromising. But we *are* going to the Serra de Santa Barbara. Our friend Fagundes is not very enthusiastic. But off we go. We take off from the north side

where we are joined by big José, one of Fagundes' men, and a very good helper—a strapping six-footer, good-humoured, and tireless. Also a *guia* who is one of the mountain's shepherds from Santa Barbara, and is supposed to know his way even in the fog. Of which there is a good deal.

We start at about 450 meters. The landscape here is pasture, somewhat improved but soliflucted. Low-growing, browzed heather *(Calluna)* is very abundant, but a grassy sod forms the matrix. Above 600 meters, the heather becomes denser. In the thin gray, invisible rain, the wind unfurls our capes and plasters our clothes with moisture. Our pastor-guide chatters ill-humouredly, his unshaven face bristling with silver, his malignant eyes somber. He would as soon turn back. We shall see nothing, he says. Fagundes, who is allergic to the mist, does leave us. But we carry on.

At 900 meters the cedars *(Juniperus brevifolia)* appear. This is, of course, nothing like their lower altitudinal limit. But obviously fewer cows have ventured up here (none in the winter, we are told), and the fuel-wood gatherers and sandal-makers have not caused a grave depletion. Plodding upwards through these spotty cedar thickets and continuing rough pasture, we find ourselves on a *lomba,* a long, narrow ridge at 1000 meters. And here there is an abrupt change: very little heather in a dense meadow where a grassy sward is interspersed with bristling crests of a blackish moss (maybe *Aulacomnium palustre?*). This is frost-heave! Our pastor says that *granizo* (granular, hail-like snow) is not unusual in winter and may lay on the ground for some time. It is not hard to picture the blustering winds which beat this lomba and the drenched soil, freezing from the top down, and these little crests bursting and tearing out the roots of grasses from the sod, and the moss healing over these wounds with its green-black fur! *Sphagnum* moss here is out or nearly so, for lateral water movement must be quite rapid and also surface evaporation. *Calluna* and *Juniperus* are precariously established on some of the larger mounds, but root poorly and are shorn by the wind.

Coloniel José Agostinho, the great naturalist, holding a tuft of the endemic *Luzula purpureo-splendens*. Cabrito (Terceira).

We then dip down onto a shoulder which overhangs the *caldeira,* or so it must be for the fog is very dense and we can only sense the abrupt fall ahead of us. This scooped ledge is sheltered from the lomba above by a small escarpment that is thick with bulging *Sphagnum* cushions. The ledge itself is lush with an open cedar thicket. The unharmed, unexploited cedars do not rise above two meters. They are very old, contorted and twisted, their shredded rusty bark gently peeling off their muscular trunks, the upper branches racing horizontally and sheathed with mosses, a pin cushion for orange and pink spike-rushes and transparent, miniature, filmy ferns. Laurel, heather, blueberry not doing well, but lusty crowns of *Culcita* ferns, pale green.

My companions have taken shelter not so much under the shrubs which hardly stave off the horizontally moving mist as within their capes and by hugging their elbows and holding their breath. Our grizzly little pastor, of the resentful look, allows his teeth to chatter viciously until Bento Rainha gives him a couple of swigs of wine which set his jaw manfully and light up the green in his eyes. Tongue and hand begin to move and he takes over as we munch thick bread and unctuous cheese. Big José surely thinks this is all preposterous and looks on, helplessly amused, as Antonio and Bento preciously gather one sterile grass after another, having examined its epidermis through a hand-lens and having exclaimed at its hairiness or glabrousness; as I stuff into a plastic bag one liverwort and one moss and one lichen after another and try desperately to write on a soggy page; as John dreamily walks up and down, a byronian lock across his forehead, utterly fascinated.

As my foot treads the heavy moss, sometimes not feeling the soil or the hard lava below, I am drawn into the pervasive continuity of this environment: the sky so near, the cloud not only bathing but permeating foliage and soil; the mosses indifferently covering branch, soil, and rock, decomposing to soil; the water suspended in air, in moss, in soil, condensed in foliage and moss, captive and yet flowing. The unity is almost oppressive as I lean against a cedar, its trunk in the groove of my back, the soft moss under my feet, the moist air entering to my very marrow (as it does into the bones of a bird), the needles scratching my cheek. The yellow stars of cinquefoil and loosestrife, the scarlet leaves and blossoms of blueberry shine among all the green.

But the fog does not lift, as we march along the caldeira ridge, in the steps of our revigorated guide. Once in awhile a passing drift reveals the tremendous escarpment clothed in long-leaved decumbent grasses and in creamy green *Sphagnum* cushions whence a huge-leaved buttercup flashes gold. John and I, clinging to the matted grass and to occasional well-rooted *Myrsine* and *Vaccinium* shrubs, let ourselves down, getting wetter and wetter, engulfed in the drifting fog, our hands soothed by the sweet grasses and tepid mosses, our faces brushed by mist and grass and flow-

(Continued on page 57)

ON GROWING HEATHER

By ESTHER DEUTSCH

Mrs. Deutsch has always pursued the creative arts, but not until she took up horticulture was she able to make the most of her appreciation of beauty, her ability to create, and her enjoyment of research. She started her nursery, Holly Hill, at Huntington, Long Island, six years ago; two years later, Alys Sutcliff of the Brooklyn Botanical Garden encouraged her to specialize in dwarf, unusual plants, especially the heathers.

IN THE BRIEF SPAN of recorded time man has wrought vast changes in the flora and fauna of his environment. Long before he had the leisure to record his history, man had domesticated animals to serve his diverse needs. Long before the great age of plant exploration, he had transported plants wherever he went, both for food and pleasure. These primary drives continue to this very moment, resulting in widespread changes on the surface of the globe. Man's will has ordained whether species will survive, assuring the survival of some which might otherwise have perished, and he has also knowingly or thoughtlessly eradicated species which were not of obvious use. Some people may find it hard to believe that many plants which are familiar ornaments of our landscape are not native and were completely unknown a mere fifty years ago. There are plants, like animals, which acclimatize readily and fit into the scheme of man's life effortlessly. Imported into our country, they have settled down happily in their new environment, even to the extent of becoming weeds, as animals have become pests. On the other hand, some animals have never been tamed, resisting all such efforts. The story is much the same for plant life.

This lengthy prelude has been written to point out the fact that heather belongs in the category of an undomesticated plant. It has never been tamed to the extent that it has become a reliable ornament in all gardens. It demands some understanding before it will become docile enough to settle down. In my carefully considered, non-Gaelic, admittedly prejudiced opinion, a perfectly grown heather has few, if any, peers among the wealth of flowering shrubs. Can this perfection be achieved with relative ease? The answer is "Yes!"

Heath and heather belong to the family *Ericaceae,* as do many of our choicest native plants, such as azalea, rhododendron, mountain-laurel, and leucothoë. Yet no heather is native to this continent. Heather, *Calluna,* is a monotypic genus with one species, *C. vulgaris,* and about one hundred and fifty varieties. Heath, *Erica,* comprises about six hundred species, many African in origin. All are endemic to a rather restricted range from northern and western Europe south to the Cape of Good Hope. I shall use the term "heather" to denote those heaths and heathers hardy in our area. Of the five heathers native to Great Britain, only *Calluna vulgaris, Erica cinerea, E. tetralix,* and *E. vagans* can be considered hardy here, approximately Zone 6. *Erica carnea* from the central European Alps is also of ironclad hardiness.

In its native habitat, heather is aggressive to the point of covering countless miles of northern, central, and western Europe, reaching even into the Arctic Circle. Linnaeus, in *Flora Lapponica,* tells an amusing tale of the belief of the Swedish Lapps that heather and tobacco would eventually take possession of the earth. Why should such a rambunctious plant resent civilization? The answers are subtle and many-faceted.

If a plant seems to present cultural problems, it might prove profitable to examine its ecological background, and the conventional attitudes towards similar plants, to see if a happier result can be attained. Since climate and geographical background give clues to specific cultural requirements, it is interesting to examine these factors in the countries where heather is indigenous. The area falls roughly between 50°-65° latitudes. Since this is considerably farther north

Heather garden, in summer, at the home of Marjorie Johnson Dietz near Easthampton, Long Island. The soil in this garden, which is now about six years old, consists of only sand and peat moss.

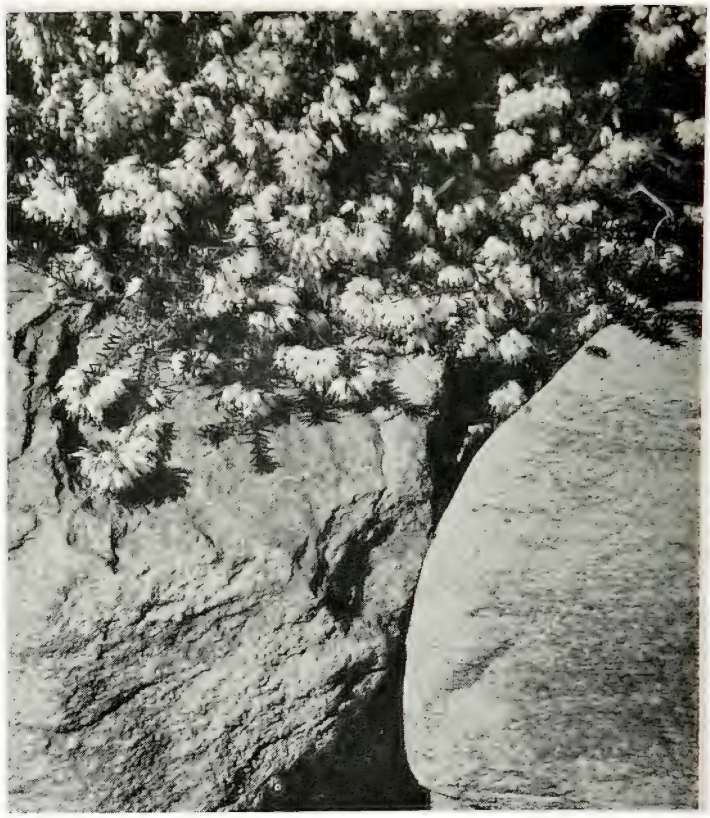
than we are—New York is at the 41°—one might assume that a much colder climate prevails. However, the Gulf Stream is the major factor that accounts for the milder and more benign climate of the British Isles, western Europe, and Norway. The weather of our eastern seaboard is influenced by the cold Labrador current flowing southward between the coast and the warming influence of the Gulf Stream. Where heather grows, mild winters and cool summers are the general rule. At these higher latitudes the hours of daylight in midsummer are longer than ours. This photoperiodism undoubtedly has some effect on plant growth, but it is difficult to interpret in relation to heather. The rainfall in the British Isles averages no greater than our own, about forty inches. A little-known point to consider is that fifty per cent of all precipitation is lost as evapo-transpiration, that is, evaporation in the atmosphere plus transpiration by all forms of plant life.

Let us now try to apply this information to the growing of such highly desirable plants as the beautiful heathers. It is probably best to cover each point separately.

Naturally one must begin with the purchase of the plant itself. This is not always as simple as it sounds with heather, especially the exquisite summer-blooming calluna, merely because it does bloom in summer and most nursery stock is sold in spring. It is wise to buy from a heather specialist to be sure of getting properly grown, properly named varieties. If bought through the mails, plants sometimes arrive in a root-bound condition. This is not desirable though most will recover and grow. Heathers have a very vigorous root system and react poorly when their roots are confined for too long a time. When a plant is obtained through the mails, it is an excellent precaution to loosen gently the ball of roots, by rolling between the hands, before planting.

The site chosen for heather can be the greatest single factor in achieving success or meeting with failure. Almost all the hardy heathers, and even some of the tender ones, will withstand temperatures as cold as 25° below zero, but they will not endure dessicating high winds. An ideal location would be one in full sun, or with at least five to six hours of sun. Shade cast by homes or trees is not as much of a problem as that directly under dense trees. Since heather plants should not be exposed to the full force of the prevailing winter winds, the site should be south or southeast with some protection, such as a building or possibly an evergreen hedge to the west and north. It is the violent vagaries of our winter weather, with extremes of temperature in one day, strong winds, and brilliant sunshine, all untempered by a blanket of snow, which can prove so damaging. If heather is planted in the path of dehydrating winter winds, a *light* cover of evergreen boughs or salt hay is sufficient to bring the plants through our worst winters in fine shape. Too much cover will smother them. They are not tender, and such winter protection as burlap or plastic wrappings is not desirable.

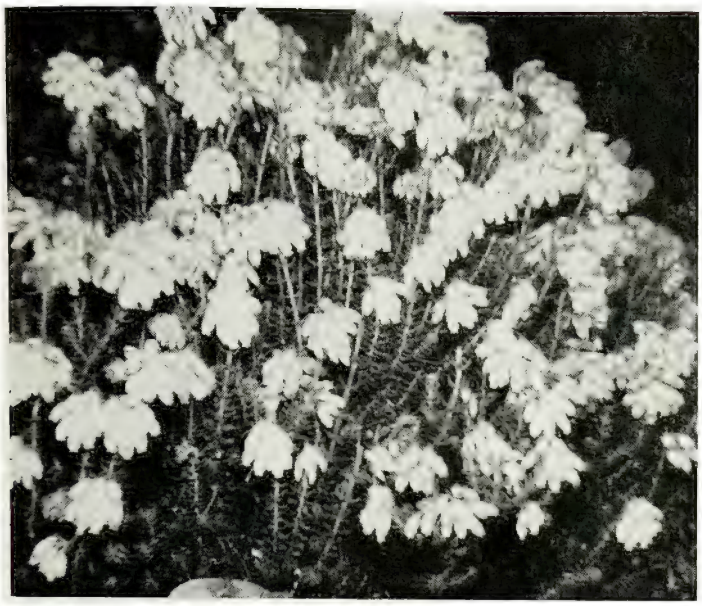
In the cultivation of *Ericaceae,* enough information on soil acidity has been written to fill more volumes than most of



Erica 'Springwood White' blooming in late winter in the Dietz garden.

Calluna vulgaris pyramidalis, a choice white heather, grows to two and a half feet.

Calluna vulgaris searlei aurea, a vigorous golden heather, bears white flowers in summer.



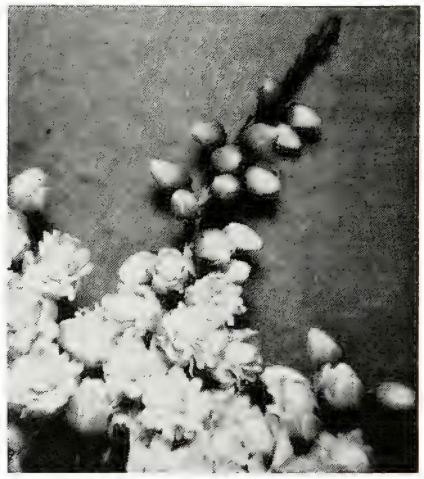
Erica tetralix mollis and close-up. One of the hardiest heaths, it has silver-gray foliage and white flowers in terminal clusters.

us would care to read. It is true that heather requires an acid soil; but, by and large, most of the soils of the earth *are* acid. Good drainage is of paramount importance. Heather, like the vast majority of our garden subjects, will not tolerate poor drainage. Its root system is very fine and dense and, like that of its kin, the rhododendron, is largely confined to the top eighteen inches of soil. To ensure the necessary degree of aeration in this layer of soil, the incorporation of large quantities of acid humus, such as oak leafmold or peat, is highly recommended. This will not only keep the soil in a condition conducive to maximum root growth but will help compensate for the lack of atmospheric humidity.

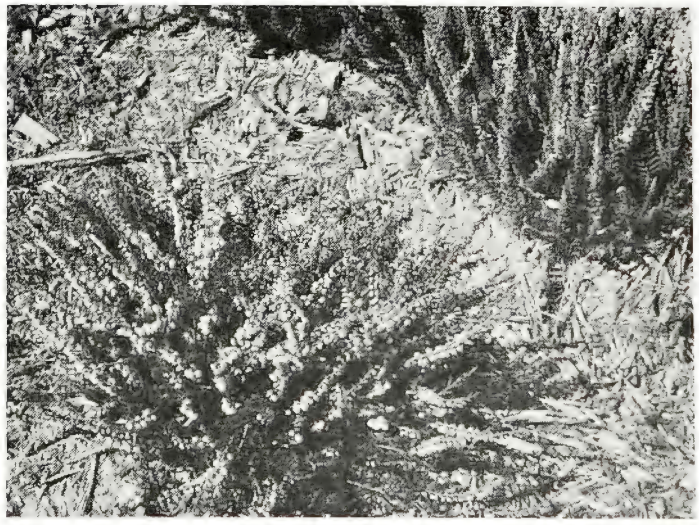
The idea that ericaceous plants will not tolerate lime in any form is scientifically unsound. All plants require calcium; and if soils are too acid, liming helps plants to absorb vital elements which, even if present, become unavailable at too low a pH. An ideal pH for heather is probably between 5-6. The simplest way to correct the soil pH in many of our coastal regions where it averages 4.5 is by the addition of lime. The nitrogen requirements of heather are almost nil, and with any average garden soil, fertilization is never necessary. It may even prove detrimental. It is not at all unusual for a plant to triple and even quadruple its size in one year. More heather has been killed by fertilization and too much water than by any other means.

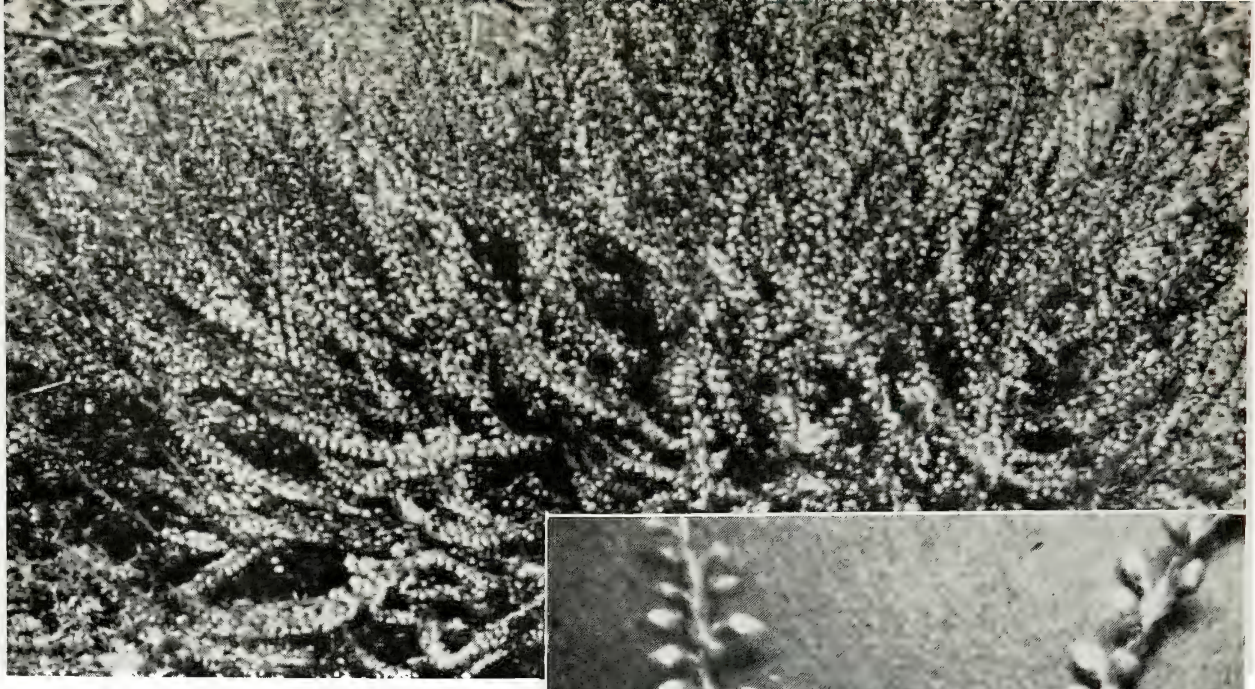
All heathers are extremely drought-resistant, almost to the point of being xerophitic. All enjoy hot, dry situations. This might, at first, seem contra-indicated by the prevalence of fog and mist in the British Isles. But, on even superficial examination, any botanist would instantly recognize the anatomy of a plant which can endure prolonged drought. In *Calluna,* the presence of closely imbricated leaves and the hairiness of both leaf and stem are definite devices for the conservation of moisture. The degree of pubescence varies. In some instances, such as *Calluna vulgaris hirsuta compacta,* the hairs are visible to the naked eye. But on microscopic examination all varieties show this trait to a lesser or greater degree. Curiously in *Erica tetralix,* which grows on peat bogs, the tomentosity is extreme, giving the plant a gray cast, and extends to all parts of the plant, the seed capsule included. Most of the ericas have linear leaves in whorls and smooth stems, and can take more water in their stride. If heathers are to be planted where they will be heavily irrigated—for instance, near lawn sprinklers—it would be advisable to omit calluna and plant ericas. In many of the fascinating dwarf forms of calluna, the foliage is such a dense, tight mass that watering, outside of normal rainfall, can prove almost as disastrous to it as to some cacti.

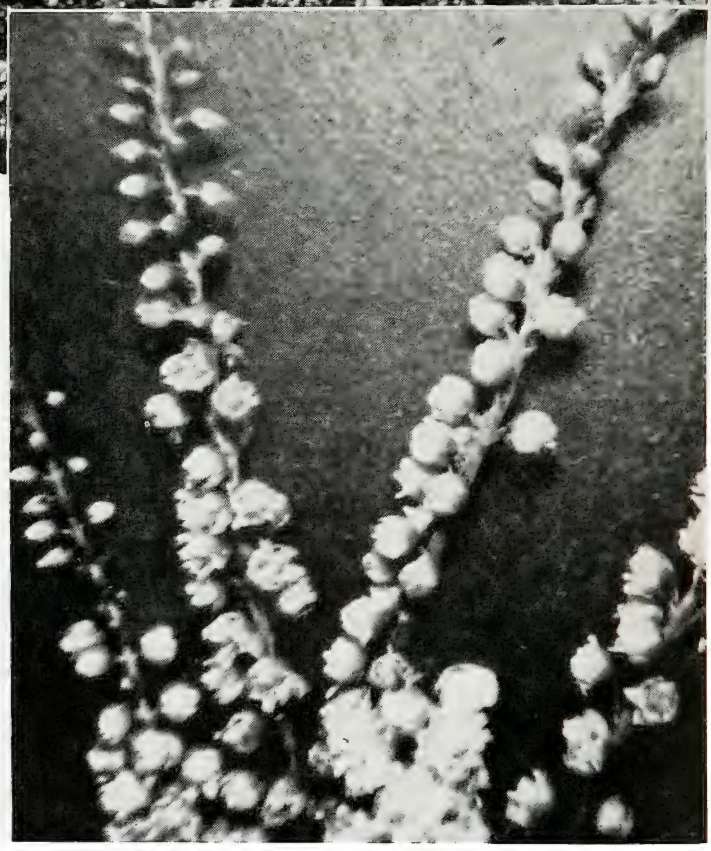
All heather benefits from an annual pruning. Not only does this keep plants shapely and attractive, but it contributes vitally to hardiness. In recent years, propagators have come to know the value of juvenility and the importance of selecting "juvenile" wood for successful propagation. In the culture of heather, pruning serves to keep the plant in a juvenile state. The flowering stems become much heavier than non-flowering wood. In calluna, the portion of the stem that flowers never again blooms and remains bare. This thickened stem is much more subject to winter injury, such



Calluna vulgaris 'County Wicklow' and close-up of its pink flowers.







Calluna vulgaris 'Tib', one of the finest of the double-flowered heathers, and left, below, close-up of its deep purple flowers.

as stem-splitting, from the extreme temperature fluctuations and high winds. Calluna blooms on new wood, and a sharp "crew-cut" in the spring will make for many new stems and consequently for increased bloom. Since *Erica carnea* sets buds for spring bloom the previous summer, it should be pruned immediately after the flowers fade. Pruning heather involves no great skill, just cutting back hard, well below the faded blooms. In fact, heather can be cut to within a few inches of the ground with benefit. If a heather is six inches, eight inches, twelve inches, or three feet at maturity, it will reach that height in one year, no matter how heavily it is pruned. The following is an approximate guide to pruning different species:

Erica carnea, May-June 15. (After the first few years, it is not necessary to prune *Erica carnea* more than every two to three years.)

Erica cinerea, March-April, or August-September.

Erica tetralix, after the first flush of bloom—about mid-July.

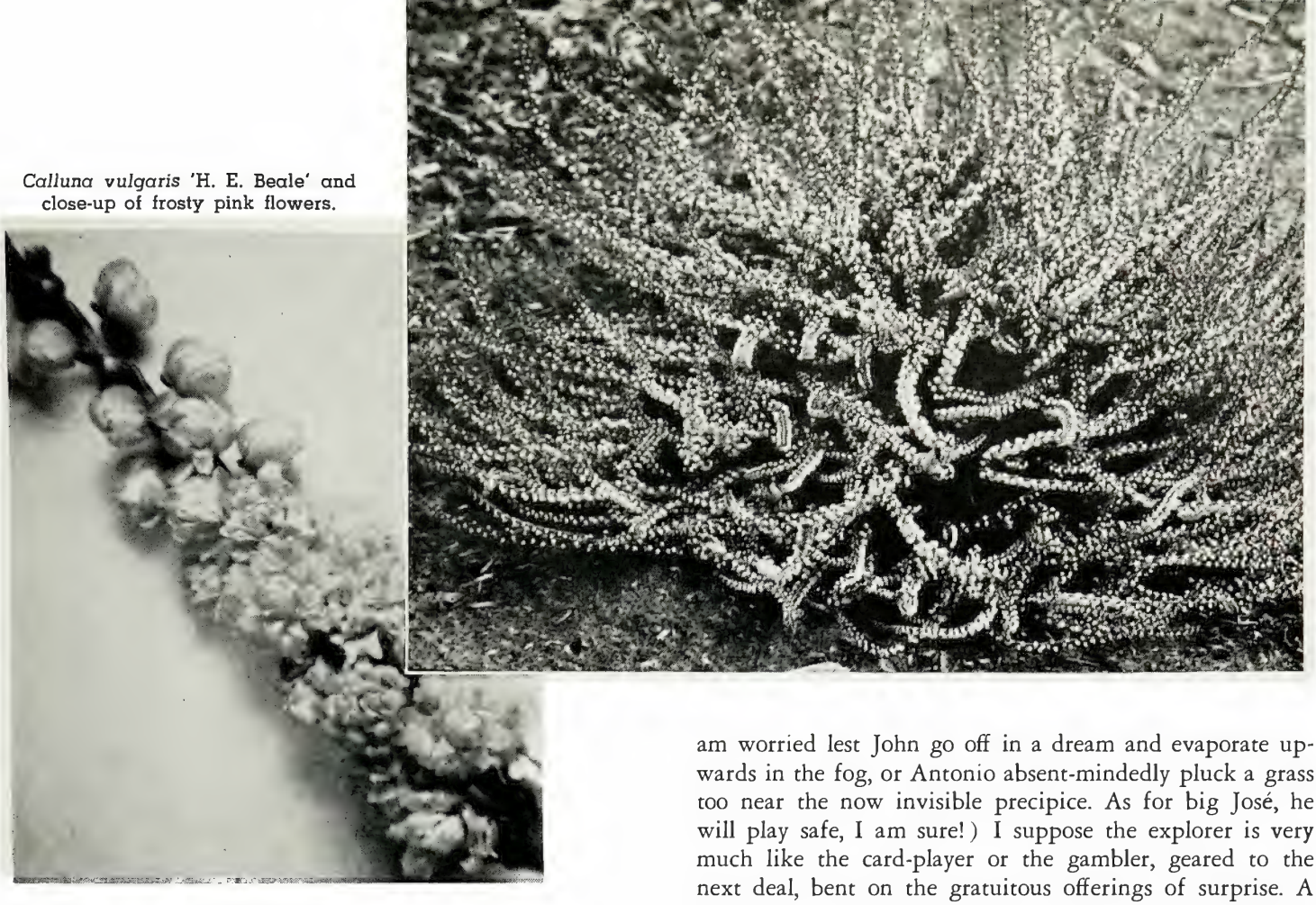
Erica vagans, March-April.

Calluna vulgaris, March-April, except for very dwarf kinds, such as *foxii nana,* 'Mrs. Ronald Gray', and *hirsuta compacta,* which need no pruning whatsoever.

The only disease I have been able to detect on heather is an unidentified fungus, possibly a mildew. During prolonged periods of very hot weather, especially if accompanied by much dampness, a browning may appear on some of the low, dense, compact forms whose foliage rests on the ground, or on the very beautiful, highly decorative golden heathers, or on the variety 'Mrs. Pat', with coral-pink new leaves. This is probably a soil-borne fungus. It is helpful to put a collar of one-half to one inch of small stones or gravel under the foliage to aid rapid evaporation of excess moisture. Spraying, or dusting with sulphur, will arrest the condition if done promptly—but avoid spraying on hot, sunny days. Cool weather seems to prevent this condition, which might account for its absence in Europe, except on greenhouse-grown plants.

On occasion, if planted too close to other plants without sufficient room to develop properly, heather can develop spider mite, largely because of the dense, evergreen foliage. With adequate spacing and good air circulation, this problem rarely arises. Most varieties should be spaced at least two to three feet apart. Proper planting depth is another essential matter. Heather planted with bare stems above ground will never flourish; it should always be planted with green foliage resting at, or slightly below, ground level. This is true even if it means planting much below the previous planting depth, for the branches resting on the soil take root and the plant will spread and thrive. Though not recommended as standard practice, it is even possible to set the entire heather plant below ground, with merely the tips exposed.

The many sterling qualities of this magnificent group of shrubs can be a big asset in the creation of beautiful and care-free gardens. The subtle range of foliage color is the most varied of any evergreen group. The habit of growth varies from tiny, bunlike cushions to three-foot shrubs with long, ferny, graceful sprays of leaves. The exquisite flowers are profuse and the bloom-period lengthy, in some clones as much as five months. Amazing as it might seem, it is pos-



Calluna vulgaris 'H. E. Beale' and close-up of frosty pink flowers.

sible to have flowers the year round, with a careful selection of varieties. Moreover, heathers are practically insect- and disease-free. No spraying, no fertilizing, no watering, and only one pruning a year—all this adds up to great garden pleasure from plants of singular beauty and charm.

ITER AZORICUM (Continued from page 52)

ers. Using my hands much more than my feet, it seems that the gusty wind is playing chords with their taut muscles while my legs and feet drum darkly against the padded rocks, rattle through the twined branches. And down, and down we go on this angel's ladder. Antonio appears and disappears at the top of the ravine as the mist thickens and thins, and I know that he is smiling indulgently.

Down below, not a plateau but a very rough *biscoito,* hirsute with laurel and blueberry bushes dimly seen. The music has stopped, unless this slow heat of expectation is a half-silent drum.

The third movement is in the ascension. Now play the heart and the lungs, an almost anguished thumping and a steady panting; and leg muscles now more taut, even strident. A few brutal kneecap stops. A discordant backslide. But withal the drifting fog, an occasional piercing pale gold arrow of light, tantalizingly gone. And at the top of the ravine the delicate nodding of the buttercups.

Back to the top and along the ridge. Always the drifting fog sometimes so dense we have to keep close together. (I am worried lest John go off in a dream and evaporate upwards in the fog, or Antonio absent-mindedly pluck a grass too near the now invisible precipice. As for big José, he will play safe, I am sure!) I suppose the explorer is very much like the card-player or the gambler, geared to the next deal, bent on the gratuitous offerings of surprise. A new plant, an unexpected beast, a vibrating beetle, a glittering stone, a dramatic face in the parting bush. And every day has brought these to us, every hour almost. But also, and equally important, the repeated impact of closely similar images beginning to etch a pattern where the stylet has hollowed the same grooves. As I walk along this ridge, my feet wet and cold with the swishing water in my heavy boots, my palms almost always extended outward so that ferns and grasses will give their caressing answer, my face moist with the pulsating mist, I sense a churning of images which will soon yield a solid picture. My feeling for the laurel-heath-cedar complex is sharpening.

Meanwhile: patience and repetition. More relevés in more stands of Azorean scrub. As I descend through yet another cedar thicket, an unblanketing wind reveals where shallow water glistens in the centre of a bog.

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It is tempting to spend every minute in the field, to do only what cannot be done later, in New York. But pressing plants, re-arranging notes, completing field sketches, locating all strategic points on topographic maps can hardly be put off. What can be put off is diary writing and letter-writing. Precious little of the latter done at this time. In fact, none. As for recording all of my impressions as they occur, allowing none to vanish unrecorded, that is a race I lost long ago. I begin telling this to John as I see him anxiously attempting to record, desperately fighting the loss of moments lived as though loss of blood. But how can I tell him that our true experiences sink into the flesh and remain forever and a thousand chords will strike in the future to recall those that are real? How could he believe me? I should not have even listened at his age.

PLANTS FROM ABROAD

ACQUIRED THROUGH THE RAY L. MURPHY PURCHASING FUND

By T. H. EVERETT

Mr. Everett is Assistant Director (Horticulture) and Senior Curator of Education.

IN FEBRUARY, 1956, a fund amounting to ten thousand dollars to be known as the Ray L. Murphy Purchasing Fund was made available to The New York Botanical Garden. According to the terms of the gift, "$5,000 be retained and invested by The New York Botanical Garden, the income thereof to be spent on plants outside the United States; the remaining $5,000 to be used for the purchase of a particular variety of flora outside the United States, on the basis of which a written report would be prepared and published."

After careful consideration it was decided that the most effective way of utilizing the money available under the terms of the gift would be to secure as many different kinds of plants as possible which would augment the living collections at the Garden. The possibilities of purchasing material likely to be of short term interest only and material commonly available, such as the popular "Holland" bulbs and seeds of easily obtainable annuals, were discarded in favor of rarer and more needed plants.

It became apparent that effectuating the policy decided upon could not be best attained only by correspondence, study of nurserymen's catalogs and placing orders by mail. An on-the-ground study of foreign plant collections seemed to offer the greatest opportunity for achieving the objectives. Because of the availability of many great living plant collections, assembled from all parts of the world and cultivated in Great Britain, that area seemed to offer the most profitable field for examination. Accordingly, in the summer of 1962 I spent from August 15 to September 15 surveying nurseries, private gardens, public parks, botanic gardens, and flower shows in Great Britain. This was a particularly opportune time because our Horticulturist, Louis P. Politi, was in Europe then and for a little more than two weeks was able to travel with me in Great Britain and assist in evaluating and selecting plants likely to be worthy of addition to the collections at The New York Botanical Garden.

Among the most important (and from our point of view most productive) plant collections studied were those at the Royal Botanic Gardens, Kew; the Royal Botanic Garden, Edinburgh; the Liverpool Botanic Garden; the University Botanic Garden, Cambridge; the Royal Horticultural Soci-

Clerodendrum bakeri. The genus *Clerodendrum* includes many attractive vines and shrubs, mostly natives of warm climates. The one illustrated is a tropical west African shrub which bears clusters of very fragrant, white flowers in summer. The flower clusters often originate from older shoots. The leaves may be fully a foot long. *Clerodendron* is a member of the family *Verbenaceae*.

Clerodendrum bakeri. In fruit this charming tropical shrub is fully as attractive as when it is in bloom. Its seeds, which are nearly half an inch long, are at first bright green but become black when they are ripe. They contrast pleasingly with the creamy white, fleshy calyx that surrounds the base of each seed and remain in good condition for a long period.

Sarcococca confusa. The habitat of this fine evergreen shrub of the Buxaceae is unknown; probably it is Himalayan or Chinese. Attaining a height of six feet, it has small, white flowers followed by red berries ripening black. Reported to be hardier than S. *ruscifolia* (which has survived some winters outdoors with us), it may prove hardy in sheltered locations at New York.

Eranthemum wattii. This is an interesting member of a family which includes many fine decorative plants, the *Acanthaceae.* A native of northern India, it thrives under warm greenhouse conditions such as suit gesneriads. Its flowers are rich violet-blue. This plant is most shapely when young and should be repropagated yearly. Unfortunately, it is rather shy at producing shoots suitable for cuttings.

Impatiens niamniamensis 'Congo Cockatoo'. *Impatiens niamniamensis* is a curious and interesting, but not highly colored, African species of *Balsaminaceae.* Its variety 'Congo Cockatoo' bears brilliant blooms. Each has a pale green limb and a strongly curved spur, golden-yellow above and bright crimson below. Its stems are purplish red. This plant requires conditions of tropical heat and moisture and good light.

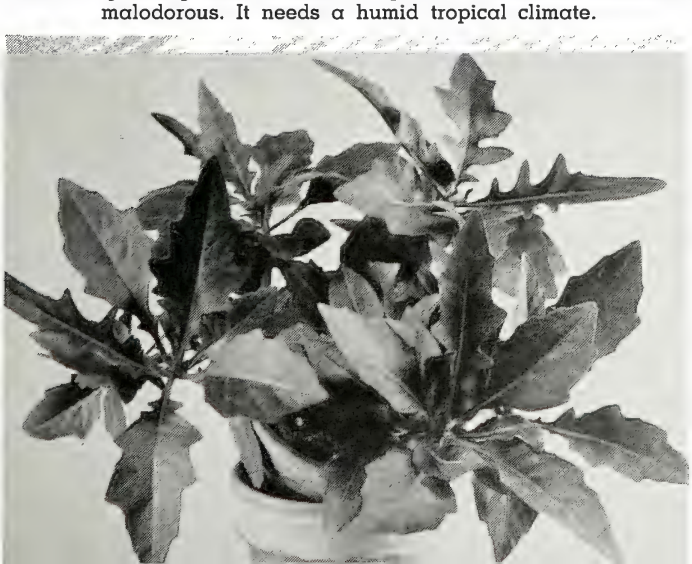
ety's Gardens, Wisley; Hampton Court Gardens; the Savill Garden; the Parks Department, Llandudno, Wales; Manchester Parks Department; Southport Parks Department; certain London Parks Departments; Bodnant Garden, Taly-Cafn, Wales; Maurice Mason's gardens, King's Lynn, Norfolk; Worfield Gardens, Bridgnorth, Shropshire; L. R. Russell, Ltd., Windlesham, Surrey; Hillier and Sons, Winchester, Hampshire; Perry's Hardy Plant Farm, Enfield, Middlesex; Clibrans, Altringham, Cheshire; Bee's Nurseries, Chester, Cheshire; Thomas Carlile, Ltd., Twyford, Berkshire; R. C. Notcutt, Ltd., Woodbridge, Suffolk; and Bloom's Nurseries, Bressingham, Norfolk.

Besides visiting gardens and nurseries in Great Britain, a careful investigation of certain other foreign sources of supply was conducted by correspondence and by checking lists which made possible the placing of orders for needed material in Holland and in South Africa.

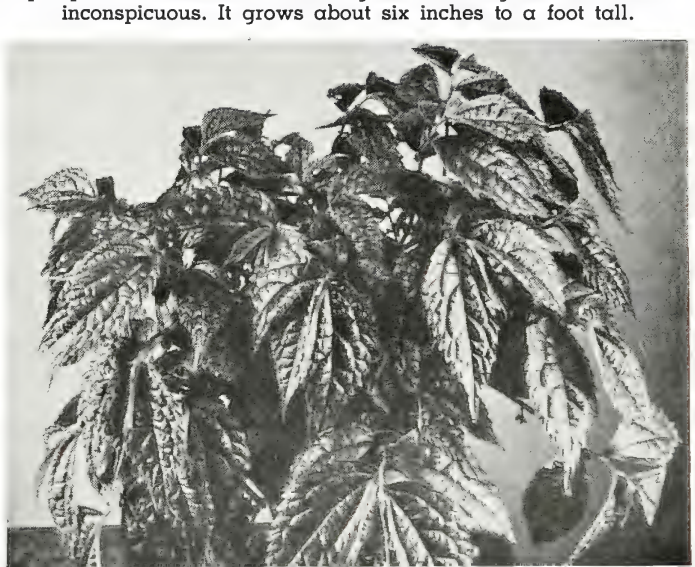
As a result of these efforts, arrangements have been completed to import from Great Britain, Holland, and South Africa to The New York Botanical Garden more than one thousand different kinds of plants (including a large number of unusual horticultural varieties as well as rare species) representing more than three hundred genera. At the time of writing many, but not all of these have been received at the Garden. In certain cases special arrangements were made to propagate items which were not available as young stock when I visited Great Britain in 1962, and which will be sent to us as soon as new young plants are established. The plants actually received at the Garden by December 31, 1964, from this endeavor represent 446 species and varieties in approximately two hundred genera. Many others are on order for delivery in 1965.

Of those already received, 182 in eighty-one genera are trees and shrubs expected to be hardy, or are at least worth testing at The New York Botanical Garden. Among the more interesting of the plants received are some so-called

Gynura bicolor. A most attractive member of the family *Compositae,* this species is a native of the Molucca Islands. Of bushy habit, it has boldly toothed leaves which are stained rich violet on their under sides, and often above as well. The small, rayless heads of golden-yellow flowers are quite attractive but somewhat malodorous. It needs a humid tropical climate.



Elatostema sessile. This is a close relative of that botanically extremely interesting genus *Dorstenia* of the *Moraceae.* Native of tropical Africa and Asia, often at considerable elevations, it offers promise as a ground cover for frost-free climates and for use as a pot plant. Its leaves are dark green and rugose, its flowers inconspicuous. It grows about six inches to a foot tall.



Oxalis fruticosa. Woody, shrubby species of *Oxalis* are rare in cultivation. This one, a native of Brazil, is of special interest because the organs which appear to be leaves are really flattened leaf stalks or petioles (phyllodes). Its small, yellow flowers are produced in axillary clusters. A humid, tropical greenhouse provides the necessary conditions for the successful growth of this member of the *Oxalidaceae*.

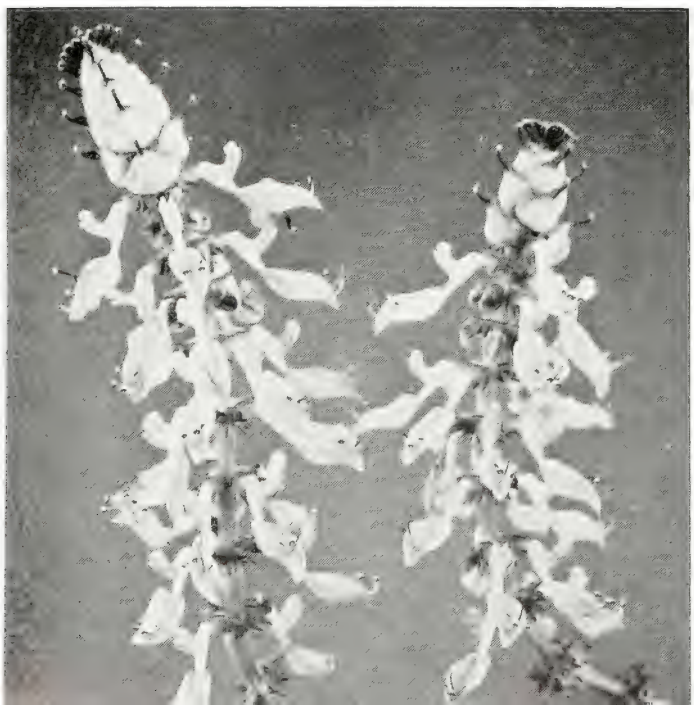
Actinidia kolomikta. A vine or rambling shrub, native of eastern Siberia to Japan, this species is remarkable for the pleasing raspberry-pink and white variegation of its foliage, a characteristic said to be most marked in staminate specimens. Its small, white flowers are fragrant, its fruits edible. Like its relative, *A. polygama,* it is attractive to cats. It is in the family *Actinidiaceae.*

Oxalis siliquosa. Believed to be a native of Costa Rica, the plant introduced under this name is a fine decorative subject for greenhouse or window garden. Free-growing and freely branched, it bears a wealth of bright yellow flowers throughout the summer. Its foliage, when grown in full sun, is a rich and pleasing bronze-red. *Oxalis* belongs in the family *Oxalidaceae.*

graft-hybrids or plant chimeras. Here belong *Crataegomespilus asnieresii* and *C. dardari* which are graft-hybrids between the English hawthorn, *Crataegus monogyna,* and the medlar, *Mespilus germanica.* We received, in addition, the sexual bigeneric hybrid between *Crataegus oxycantha* and *Mespilus germanica,* called *Crataegomespilus grandiflora.* Other bigeneric hybrids to be acquired as a result of this venture are *Pyronia luxemburgiana (Cydonia oblonga* × *Pyrus communis), Sorbopyrus auricularis (Pyrus communis* × *Sorbus aria), Amelosorbus jackii (Amelanchier florida* × *Sorbus scopulina)* and *Sorbaronia alpina, S. dippelii, S. fallax, S. hybrida* and *S. sorbifolia.* The first named *Sorbaronia* has *Sorbus aria* and *Aronia arbutifolia* as its parents; *S. dippelii* is a hybrid of *Sorbus aria* and *Aronia melanocarpa* and the parentage of *S. fallax* is *Sorbus aucuparia* and *Aronia melanocarpa. Sorbus aucuparia* and *Aronia arbutifolia* are the parents of *Sorbaronia hybrida.* The parents of *Sorbaronia sorbifolia* are *Sorbus americana* and *Aronia melanocarpa.*

Other trees, shrubs, and woody vines we are especially happy to add to our collections include the kolomikt vine, *Actinidia kolomikta,* an Asiatic member of the family *Actinidiaceae* which, in this staminate form and when grown in a sunny location, has its leaves beautifully blotched with white and pink. *Pileostegia viburnoides,* from the Ryukyu Islands, may not prove hardy outdoors here but is, we feel, well worthy trying in a sheltered location; it is closely re-

Coleus spicatus. Excellent specimens of this native of southeastern India bloomed at The New York Botanical Garden in the late summer of 1963 and of 1964. It occurs naturally in light shade in stunted jungle but in cultivation appears to prefer full sun. Its rosy lavender flowers, each three quarters of an inch long, are in spikes. This plant belongs in the *Menthaceae.*



Anaphalis triplinervis. A perennial herbaceous plant belonging to the family *Compositae* and a native of the Himalayas, *A. triplinervis* grows eighteen inches to two feet tall, is much branched, and bears an abundance of white, strawy everlasting-type flowers which remain attractive for a long time. It needs full sun and a well-drained soil for its successful cultivation.

Strobilanthes atropurpureus. We do not expect to find a representative of the almost exclusively tropical genus *Strobilanthes,* family *Acanthaceae,* hardy at New York, but *S. atropurpureus,* unexpectedly a native of Siberia, confounds us. It thrives in our nursery and develops erect, six-foot, herbaceous stems which bear inch-and-a-half-long, rich purple flowers in summer. It thrives in ordinary soil without special care.

Cyanotis arachnoidea. The plants of this species introduced to The New York Botanical Garden from England were collected at 8,600 feet on Mount Dodabetta in southern India in 1961. Belonging to the family *Commelinaceae,* it has succulent stems and leaves and small, clear blue flowers with blue-bearded filaments and orange-colored anthers. It grows without difficulty in a warm greenhouse.

Scutellaria javanica. This interesting member of the family *Menthaceae,* which makes a useful pot plant for summer bloom in a warm greenhouse, quite likely would thrive outdoors at that season. Of tidy habit, it produces many terminal spikes of flowers, each deep purple with a paler blue-purple lip. This *Scutellaria* is a native of fairly high elevations in the East Indies.

lated to *Schizophragma.* A pendant variety, *Sorbus aria pendula,* of the white beam tree should prove a welcome addition to our "weeping" trees.

Meliosma veitchiorum is a fragrant, yellow-flowered representative of the mostly tropical *Sabiaceae,* which hails from central China, and is certainly the hardiest representative of the family; it will be given a well-protected location. The Asiatic sweet-gum, *Liquidambar formosana monticola,* has been obtained, also *Disanthus cercidifolius,* a native of Japan. Both belong in the *Hamamelidaceae,* the Witch-hazel Family.

To our magnolia collection is added *Magnolia soulangiana brozzonii; M. thompsoniana,* the latter a hybrid between two American species; *M. tripetala* and *M. virginiana,* which has fragrant flowers five to six inches across in summer; *M. officinalis biloba*; and the more tender kinds *M. sprengeri elongata, M. dawsoniana, M. sargentiana robusta,* and *M. sinense.* The last four will be tried in protected locations and as subjects for espaliering on walls in sheltered places.

The evergreen *Sarcococca confusa* of western China, which has fragrant flowers and bears red berries which ripen black, *Neillia longiracemosa,* also a western Chinese shrub, which has pink flowers, and *Hibiscus sinosyriacus* are among many other shrubs new to our collections which have been obtained by us through the Ray L. Murphy Purchasing Fund.

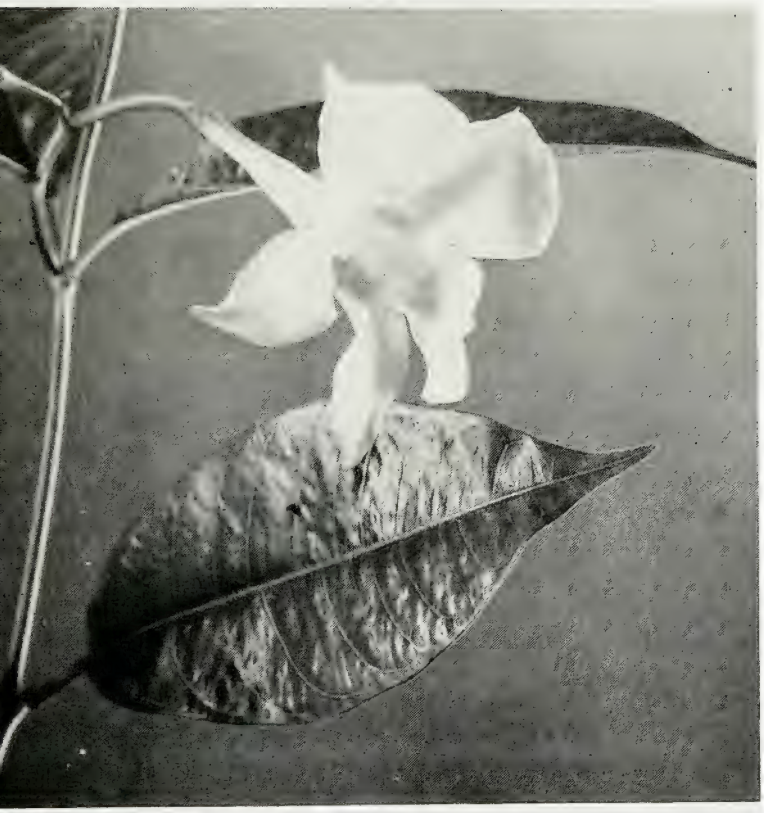
With the exception of a selection of aquatics and bog plants, comparatively few of the non-bulbous herbaceous perennials selected will be received before the spring of 1965. By the end of 1964, only thirty species and varieties had arrived. Among those on order and yet to come are 329 species and varieties considered to have promise as subjects for rock gardens and perennial plantings. It is not expected that all will prosper under our climatic conditions, but all are considered to be worth testing. In making the selections we were strongly influenced by our experience with related species and varieties under New York Botanical Garden conditions. For instance, included in the plants we have ordered are a goodly number of campanulas, some interesting dianthuses, selected geraniums, ligularias, sedums, thymes, antennarias, artemisias, and veronicas as well as plants of lesser known capabilities such as *Cardamine pratensis plena, Epilobium kai-koense, Euphorbia griffithii* 'Fire Glow', and *Hydrocotyle moschata.* The bigeneric hybrid between *Heuchera* and *Tiarella* named *Heucherella* 'Bridget Bloom' has proved excellent in British gardens; as its parents thrive well under our conditions, it is reasonable to expect good results from it here.

Among twenty-eight species and varieties representing twenty-five genera of aquatics and bog plants received, noteworthy is the water soldier, *Stratiotes aloides,* a plant remarkable because in spring it rises to the water surface where it lives and grows all summer and in fall descends to or near to the bottom of the pool, where it remains through the winter. The European frogbit, *Hydrocharis morsus-ranae,* a close relative of the water soldier, has also been received. This plant makes an annual growth which dies in the fall, but detached winter buds sink to the bottom when the old plants succumb, and in spring these resume growth and rise to the surface where they live through the growing season as free-floating aquatics. Other aquatics and bog plants received include the curious *Juncus effusus spiralis* with cork-screwed leaves, *Scirpus zebrinus, S. albescens,* newly introduced to Great Britain from the Orient, *Preslia cervina,* with aromatic flowers and foliage, and a species of water buttercup recently introduced to England from Denmark.

Of hardy bulbs we have purchased and received forty-nine species and varieties representing eleven genera. Included here are *Allium. Corydalis, Eranthis, Erythronium, Hyacinthus, Sternbergia, Leucojum,* and *Narcissus.*

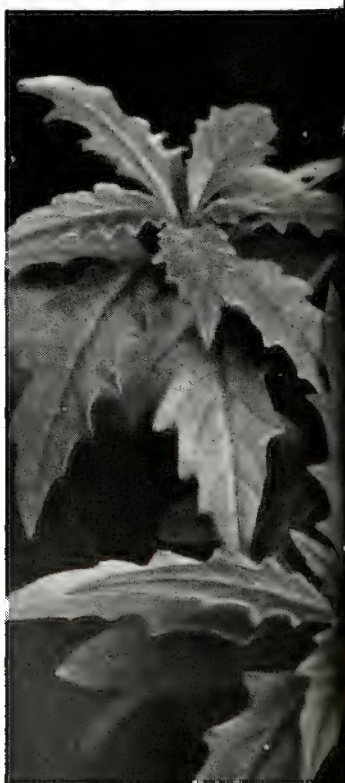
Our indoor collections were considerably enriched by the

Bredia tuberculata. Although first described in 1932, there is no record of this species having been cultivated before 1943. A member of the family *Melastomaceae*, and a native of western China, it blooms freely in summer when grown under conditions which suit begonias. Its stems are red, its flowers pink. This is pleasing as a pot plant.



Dipladenia boliviensis. A native of Bolivia, this beautiful, tropical, twining vine first bloomed in cultivation almost a hundred years ago. Two years later, in 1869, it was illustrated in the *Botanical Magazine*. Pictured here is a specimen in our propagating greenhouses in 1963. A member of the *Apocynaceae*, its flowers are pure white with deep yellow inside the throat.

Gynura sarmentosa. This Malaya
vation in that it is a twining, clim
are of a rich violet hue; its flowe
involucres. The leaves are softly
the family Compositae ne



Staurogynopsis paludosa. This is the botanical type of a genus first described in 1959. A native of the Ivory Coast of Africa, it belongs in the family *Acanthaceae*. It is a low, trailing plant with leaves green above and gray beneath. Its flowers, individuals which last for only one day, are pure white. It needs tropical temperatures and a humid atmosphere.

Turnera ulmifolia angustifolia. This is a member of a family rare in cultivation, the *Turneraceae,* which is related to the *Violaceae* and the *Passifloraceae. Turnera ulmifolia angustifolia,* a native of Brazil, is a summer-flowering shrub with golden-yellow flowers, two to two and a half inches in diameter. It is an attractive greenhouse subject and may be used outdoors during the summer. It blooms over a long season.

Iochroma tubulosa. A native of tropical America, this low shrub of the family *Solanaceae* blooms for a long period during summer. Its drooping, tubular, bright blue-purple flowers are borne in clusters. It grows well under cool greenhouse conditions and during the winter should be kept somewhat dry and rested. In spring it is pruned back and restarted into active growth.

iffers from other gynuras in culti-
Its stems and involucral branches
e orange-yellow with violet-purple
coarsely toothed. This member of
humid growing conditions.

Schaueria calycotricha. Sometimes known as *Justicia calycotricha,* this member of the family *Acanthaceae* is a Brazilian subshrub which is desirable for cultivating under humid, tropical conditions. Both its flowers and bracts are pale yellow and are arranged in showy, dense, terminal spikes. They contrast with the rich green foliage. This species blooms well even when quite small.

Hibiscus sinosyriacus. Discovered in China in 1920 and described in 1922, this stout shrub differs markedly from its close relative *H. syriacus* in foliage and in other botanical characteristics. The specimen illustrated bloomed in our nursery in the fall of 1964. Its flowers are three inches wide, white with deep crimson centers and conspicuous cream-colored anthers. It belongs in the *Malvaceae*.

Zantedeschia aethiopica 'Crowborough Variety'. The common calla-lily, *Zantedeschia aethiopica* of the *Araceae*, is cultivated in most climates where little or no frost occurs and in greenhouses. It is a native of South Africa. The new 'Crowborough Variety' has larger flowers and is much hardier than others; in England it overwinters outdoors. Just how much cold it will stand is not known. This picture was taken in our greenhouses.

acquisition of bulbous species and varieties to the number sixty-two, representing twenty-six genera. Among tender bulbs received the following genera are represented: *Arum, Babiana, Bloomeria, Gladiolus, Hesperantha, Hippeastrum, Homeria, Homoglossum. Lachenalia, Leucocoryne, Lycoris, Nerine, Ornithogalum, Oxalis, Pancratium, Streptanthera, Synnotia, Tritonia, Eucomis,* and *Haemanthus*. Sixty-three other tender bulbous and other indoor species are on order for delivery in 1965. These represent sixteen additional genera.

Cacti and other succulents have been obtained in forty-six species and varieties, representing thirty genera, and other tropical and subtropical plants to the number of forty-nine species and varieties. Many of the most interesting are illustrated and commented upon in these pages. Because the trees and shrubs acquired are of necessity small and recently propagated specimens (under quarantine regulations it is not permissible to import plants larger than is deemed necessary to assure the aquisition of live stock), very few lend themselves to illustration at this time.

This, then, presents a picture of the benefits which have accrued to the Garden in extending its living plant collections by expenditures from the Ray L. Murphy Memorial Fund up to December 30, 1964. A small part of the original five thousand dollars "to be used for the purchase of a particular variety of flora outside the United States" is still unexpended. It is planned to seek out yet other plants, which we need to augment the collections at the Garden and which can be obtained from abroad, and to order and import these in 1965.

Homoglossum salteri. This recently named species, grown in a cool, sunny greenhouse, bloomed well at the Garden in December, 1964. *Homoglossum* is a South African genus of the family *Iridiaceae* and is related to *Gladiolus*. The flowers of *H. salteri* are rich brick-red with some yellow in the throat and with dark-colored anthers. They measure about two inches across.

Eucomis zambesiaca (?). Some uncertainty exists as to the correct identification of this species of *Amaryllidaceae*, but it possibly represents a dwarf form of *E. zambeziaca*. In our propagating greenhouses it grows about eight inches high and bears many three-inch-long spikes of fragrant, pure white flowers in summer. A crown of leaves tops each flower spike. *Eucomis* is a South African genus of bulbous plants, mostly greenish-flowered.

THE CITIZEN'S ROLE IN COMMUNITY PLANNING

By GUY F. ROBBINS

Dr. Robbins, an internationally known cancer surgeon, gave this talk at the Garden Club of America Forum, held at the Hotel Pierre in New York on November 17, 1964. He is a recipient of the Distinguished Citizens Award of the National Municipal League.

AS A NEWCOMER to Westport, Connecticut, twelve years ago, my involvement in civic affairs was limited to scanning the local newspapers and voting the straight Republican ticket.

One evening at a cocktail party, I asked one of the local "civic giants" a question relating to some current fiasco which only politicians can hatch. He would not give a sensible answer to the question, but let me know that I should either keep quiet or perhaps get out of town before I caused a lot of trouble for those who were doing, in his mind, a really good job.

Well, I got mad—mad enough to go to work and do something about Westport. There was no torch parade for motherhood or against sin—just hard work. And it didn't take long to rally together others in town who were willing to work toward a better Westport.

I consider myself still an intern in civic matters, so when Mrs. [Thomas M.] Waller invited me to present my viewpoint of the "Citizen's Role in Community Planning," I was flattered. Your organization is a positive force in communities throughout America—there is evidence of this in both Westport and Southport. The more I thought about the message I could bring to you, the more I realized that mine was the mission of bringing coals to Newcastle. However, practical experience has shown that there are many ways to bring coals to Newcastle and effective planning to yours and my community.

Perhaps some of my experiences will be of benefit to you who are involved in community planning. I know that the more I became involved, the more I realized that seemingly unrelated facets of town government were quite dependent upon each other. If Westport was to grow gracefully and not go broke in the process, it was necessary to understand and work on the overall governmental problems. As an example—a tax structure based on whom you know and not on what the property is worth will do more to stop planning than any one item on the list. I know—we had it!

What makes up community planning? It seems to me that this must first encompass a blueprint for the long-term needs of today's and tomorrow's citizens, taking into account that yesterday's town officials may not have envisioned many of the problems which now face their towns.

To get this blueprint is a real achievement, but the task of implementation separates the dreamers from the doers. Perhaps it is better to phrase it—it's tough to get "idea people" and those with the political "know-how" to work together effectively.

What are the specific ingredients necessary for living and planning at the community level? Let us consider six interrelated ones.

1. *An adequate and workable form of government.* Even local government is big business these days. Our town—Westport—has an annual budget of over $7,000,000 and a debt of nearly $10,000,000 with some six thousand homes and room for three thousand more, if the zoning isn't changed. This means that there *must* be professionals in key positions. With eighty per cent of our annual expenses going to salaries, not much is left for open space projects, road maintenance or building new roads, some of which should have been built in the 1940's. The interrelationship of the School Board, Planning and Zoning Commission, the Department of Public Works, and so on must be clearly defined so that one group will not take off into the "blue beyond" and thus cripple the entire projected course of development of all important facets of government. If our people had purchased for our high school a piece of land which had adequate soil, we would have saved $150,000 spent to pump sewage up-hill! This money could have been used to build a town garage, or to buy open space.

2. *People in government—salaried as well as those on the elected and appointed boards—who have integrity and understanding of their responsibilities.* Even with the above assets they may do a second-rate job, if they can't communicate, don't understand the overall problems, or lack the will to fight. The citizens must be well enough informed to help them, and sophisticated enough to guide them if they go astray. At one time, Westport had a Planning Commission with a speculative builder and a surveyor as members. Both were heavily involved with personal dollars relating to development of large tracts of land. Who appointed them? Well, it was no different in Westport than in many other towns.

3. *Necessary facilities — well-balanced.* A community should — but rarely does — maintain a well-balanced group of facilities: a) schools, b) public utilities, c) Public Health and Safety Departments, d) recreation facilities, e) quality control of building of homes and commercial buildings, and f) an effective and active Planning Commission. All are so closely related. However, if one area is weak because of pressures to promote one or more of the others, future planning or implementation of current plans is most difficult.

4. *Communication between town officials and citizens.* This takes teamwork, understanding of human nature, and must be done on a continuing basis. Have you noticed how some town officials (yes, husbands and wives, too) often try to wish away their problems and mistakes instead of facing up to them? Again, an informed "citizenry" can do much to motivate town officials into following a program of action.

5. *Equitable tax base.* Here is the seed of the future of every community. Unless citizens recognize and accept this, planning is a joke—a horrible joke at that! If a particular group of citizens—say the business men—are undertaxed on commercial land and inventories, they may do everything to

keep things status quo for fear that they may lose their preferential treatment. As a result, the possibility of improving parking areas is lost to them. "There isn't enough money coming in for both education *and* parking." So, if the merchants yell about the cost of schools, the School Board may point out the businessmen's preferential tax status. Take the man with large land-holdings. One could go on—but here again we reach the solution of such problems by citizen-action and a professional assessor.

6. *An enlightened and informed citizenry.* This last point is really the adhesive which pulls the other five facets together and should also act as an abrasive to rub off the rough undesirable edges of the others.

How does one become informed and thus lay the groundwork for effective action in community planning? There is no guidebook to which one can turn. The techniques are different in each community.

Before discussing one plan for becoming an effective citizen in community planning, let me tell you what you may get out of it personally.

1. You will be attacked constantly by those who *don't want* change; who like preferential taxation; who consider the town's future only from the standpoint of how much cash they can get out of it; who are interested only in schools and forget road improvement, recreational facilities, open space programs, and so on; and by quite a few others who don't believe in fighting for anything but their own crabgrass.

2. You will make many new friends.

3. You may lose a few old friends.

4. You will provide a source of tax deduction, if you give toward the local cost of open space.

5. You may impress your family with your community spirit, but more than likely you will probably drive your loved ones frantic by answering the phone during dinner, attending too many meetings, and reneging on many family projects which you yourself started before you became involved in community planning.

6. And lastly—you will share the satisfaction, with others, as a member of that old-fashioned group who believes that America's future depends on effective grass-roots efforts.

One should not accept sustaining responsibility at the community level unless he has done a great deal of homework. I have been told that those involved in corporations frequently approach their problems in the following manner: a) definition of the problem; b) facts relating to the problem—pro's and con's; c) development of programs resulting in probable solution of the problem; and d) dissemination of information relating to the problem and solutions. Then, and only then, are efforts made to obtain policy decisions and implementation of them by the proper authorities.

In preparation for becoming an effective citizen, all these points should be studied, memorized, and practiced. Some "Do's" and "Don't's" go hand in hand:

1. Always work as one of a team and never go off on a tangent by yourself.

2. Take the time and effort to understand the administrative functions, dollar problems, and the local personalities involved in the many facets of community life.

3. Cherish relationships with people by helping them with their pet projects, especially if you want their aid on projects dear to your heart.

4. Become knowledgeable as to how reporters, editors, and other "giants" in the area of communication think and function. Once you have this knowledge, use it in dealing with them. Believe me, it doesn't pay to get in a cat-and-dog fight with them. You will lose, every time.

5. Be discreet in victory and quiet in defeat. When your team loses, do an audit in order to build for the future.

6. When you become involved in a project, have a broad understanding of the pro's and con's. Planning should be prospective and implementation should not be left to chance.

Most of what I have said is based on my own experiences. The efforts must be part of a sustaining program which is reasonably alive at all times, never dead, and always ready to go into high speed with a minimum of grinding of gears. Such a program requires leadership by a hard core of sophisticated, well-disciplined people—both men and women —who control their emotions when they lose and keep their objectives in focus at all times. Converts are essential—hard work is the order of the day.

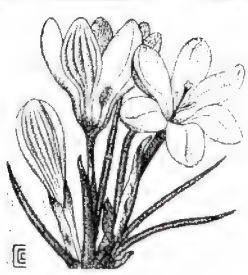
The story is told of a cab driver going down Pennsylvania Avenue with the wife of a foreign dignitary as a passenger. The passenger pointed to an inscription on one of the government buildings and asked the driver what it meant. The inscription read:

"What is Past is Prologue—Study the Past."

The cab driver said it means, "Honey, you ain't seen nothing yet!"

Yes, we "ain't seen nothing yet," but I do believe that what we shall see depends to a great degree on what you and I do, or fail to do, as citizens in community planning.

I held them in my hand, small bulbs of wonder,
Purple and ivory and brown.
I broke the soft, dark earth to fold them under,
And pressed the yielding soil to hold them down.



I know that in their hearts the rainbow lingers
Waiting until it hears a song it knows.
Oh, strange—to hold a rainbow in my fingers!
It lies there waiting for the melting snows.

And long before I hear the bluebird singing,
Truth will be stirring in my garden beds.
And oh, it will be early that I'll find
Their small, green hooded heads.

Louise Driscoll

Upper left. *Veltheimia viridifolia*, the forest-lily, has smoky pink flowers. Lower left. The flowers of this gazania are burnt-orange; in others, the flowers are red.

SOUTH AFRICAN ORNAMENTALS FOR AMERICAN PLANT CONNOISSEURS

By Russell J. Seibert

Dr. Siebert is Director of Longwood Gardens, Kennett Square, Pennsylvania. He is president of the American Horticultural Society and its U.S.A. representative to the International Society for Horticultural Science, and is a member of the planning committee for the International Horticultural Congress to be held at the University of Maryland in August, 1966. The subject of this article was presented as an illustrated talk at the nineteenth American Horicultural Congress, October, 1963.

Upper right. *Disa uniflora*, known as "Pride-of-Table-Mountain" in South Africa. Lower right. The coral-red flowers of *Alberta magna*, a small tree of the Madder Family.

In 1963, the National Botanic Gardens of South Africa at Kirstenbosch celebrated its Golden Jubilee. The Botanical Society of South Africa, the sponsoring organization of the Botanic Gardens, attained the age of fifty years at the same time. Professor H. B. Rycroft, the Garden's Director, invited fifty botanists from twenty-one countries to participate in the celebration from mid-September through October. I was fortunate to be able to make the journey to South Africa and join in the two weeks of meetings in Cape Town and the botanical tour through South Africa the ensuing month.

The site of the Kirstenbosch Botanic Gardens was originally selected over fifty years ago. It is located about seven miles south of Cape Town on the southern slope of Table Mountain and in sight of "Castle Rock." The gardens are devoted to the indigenous flora of South Africa. However, a few foreign plants are prominent, such as the European oak, *Quercus robur*, whose intrdouction dates back to the earilest Cape Town settlement by Jan Van Riebeeck in 1652.

One of the loveliest of the trees of South Africa, *Podocarpus falcatus*, has a featured spot at Kirstenbosch. Known as the "yellow wood," it is one of the best South African lumber-producing trees. One of the most publicized trees of that far-off part of the world is the "silver tree," *Leucadendron argenteum*. It really does appear to be of silver, its leaves flashing in the sun and wind. Unfortunately, the tree has all but disappeared in the wild; however, it is being planted wherever it can be cultivated successfully.

The *Proteaceae* include the silver tree and the very interesting *Leucospermum reflexum* and *L. nutans*. The leucospermums or "pincushions" are among the favorites of this family. *L. reflexum* has great possibilities for use in arrangements, since it will last for a month as a cut flower. *L. nutans* is planted a great deal along the landscaped modern highways of South Africa.

The proteas present one of the real horticultural challenges in that country, not to mention the innumerable problems with which the American horticulturist is faced in attempting to grow them. At the botanical reserve at Paarl, the proteas are well grown under the cool, dry nights and constant breezes, and in acid soil.

One of the proteas popular as a cut flower, *P. cynaroides*, reminds me of a painted artichoke. The finest of all, *P. aristata*, has been almost annihilated in nature, but it is hoped that this species can be successfully grown and saved. The beauty of its buds is outstanding in the genus. *P. repens*, the "sugarbush," is a floral emblem of South Africa.

You may wonder if proteas are to be seen in America. To

Podocarpus falcatus in the National Botanical Garden at Kirstenbosch, South Africa.

some extent, they are grown in California and may be seen in a few San Francisco and Los Angeles gardens. The silver tree, *Leucadendron argenteum,* is famous in Santa Barbara where it is grown on the Dickinson Estate.

The technique of growing proteas is being studied at Longwood Gardens, where a number of them have been flowered and an occasional one exhibited. We have flowered *Protea repens, P repens alba, P. obtusifolia, P. neriifolia,* and *P. compacta* and hope, before too many years pass, to be able to flower them reliably for annual display.

Proteas require nearly four to five years before they begin flowering. The big problem is to keep them growing that long (since their growing requirements are very exacting) and that is just the opposite from our natural as well as most of our greenhouse conditions.

South Africa has many interesting flowering plants, the majority of which are rarely seen in America because their requirements are so different from the conditions under which we are accustomed to grow plants. Take *Alberta magna* of the *Rubiaceae*—it is seldom seen even in California. We finally flowered it once at Longwood Gardens. Many have tried and as many have failed to grow South Africa's most beautiful and most frustrating orchid, *Disa uniflora.* However, a few South African plants are among some of our favorites for Longwood's horticultural exhibits: *Veltheimia viridifolia,* nemesia hybrids, freesias, clivias, pelargoniums, gladiolus species and hybrids, and *Gerbera jamesonii.* The last is known as Transvaal daisy here in America, but in South Africa as Barberton daisy. It is indigenous to the mountains around Barberton in the Transvaal, and one of the few plants which the South Africans themselves are hybridizing. As a rule, they do not like to hybridize their native plants. The Namanqualand daisy, *Ursinia anthemoides,* spreads over many square miles of southwest African semidesert during their spring month of September. Some of the ursinias are proving to be interesting spring-flowering annuals for trial at Longwood Gardens.

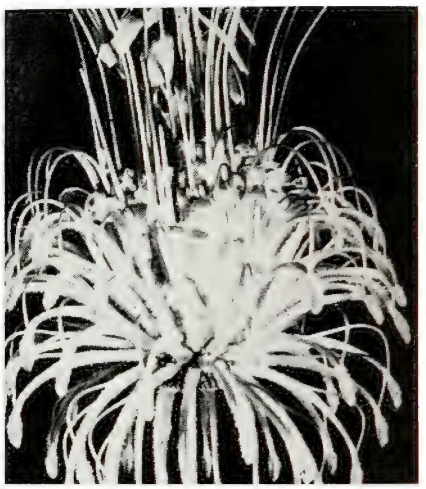
Gazanias from South Africa are becoming more popular as garden plants in the East. Many of them are prolific and colorful in flower—if placed on exposed sites and not overwatered.

The everlastings or strawflowers, *Helichrysum,* were more popular in this country than they are now. The South Africans like these flowers very much; perhaps they will once again become popular in American gardens.

South African plants could not be discussed without mentioning *Aloë.* Of the hundreds of species in this genus, I still think *A. ferox* is one of the best; moreover, its mucilaginous juice is one of the finest burn remedies known. It is even being used in a suntan lotion. Keep a potted plant of *A. ferox* in your house—sooner or later you may find it useful.

Gerbera jamesonii, the Barberton-daisy.

Leucospermum reflexum in the Botanical Reserve at Paarl, South Africa, and a close-up of its brilliant reddish orange flowers.



Aloe ferox, the bitter aloe; its mucilaginous juice heals burns.

TALAUMA MEXICANA - THE "HEART FLOWER" TREE

By THOMAS MACDOUGALL

Mr. MacDougall spends considerable time every year in the States of Oaxaca and Chiapas, Mexico, gathering together study collections of plants, mammals, and reptiles for institutions and individuals.

THIS IS THE second of a series of notes on flowering trees, famous in the history (including pre-history) and folklore of Mexico.

The common names of *Talauma mexicana,* in Spanish as in English, are literal translations of the Mexicano *yolosuchit,* which, in turn, is one of the Spanish spellings for the spoken word. *Guielachi* the name in Zapotec, has the same meaning, and my recollection is that the names, in at least a few other native languages, also have the same meanings. Ethnological research in a score of native races and languages could uncover much "heart-flower" lore.

In *Trees and Shrubs of Mexico* by Standley, *Talauma mexicana* is referred to as "One of the best known of Mexican trees." I would qualify this by adding "in literature and folklore," because as a living tree it is not well known.

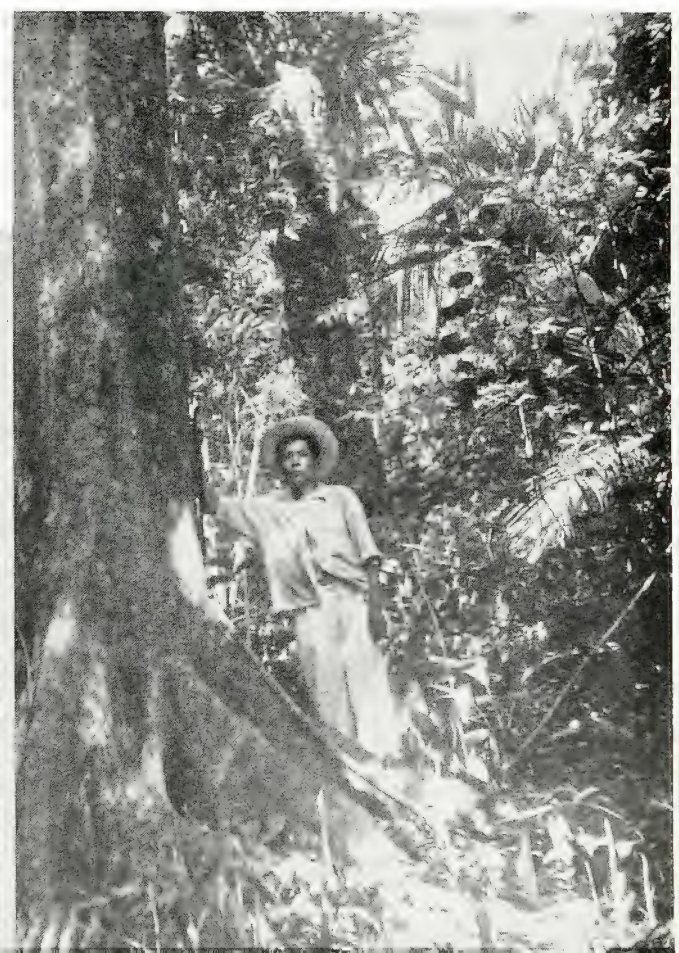
My acquaintance with *Talauma mexicana* in habitat is limited to a few spots in rain forests, of Atlantic drainage, in the States of Oaxaca and Chiapas. It grows in areas of good deep soil with a range in altitude of approximately fifteen hundred to three thousand feet, but most of these areas have been, or will be cleared for corn.

Dr. Faustino Miranda states that the species is very abundant in the region of Monte Libano, in the lacandon rain forest, of eastern Chiapas. He gives tree dimensions of fifty meters in height, with more than one meter in trunk diameter; my own estimates of maximum sizes are one hundred and fifty feet in height by more than three feet in diameter above the butt swell. These dimensions permit the species to be one of the dominant "topstory" trees of the virgin, high rain forest.

The common names for *Talauma mexicana* are thought to be derived from the shape of the flower-bud. The remedial use of the flower is usually for "palpitations," and to the native mind these could be associated with the heart. The liquid from an infusion of fresh petals, or from boiled, dried petals, is taken internally.

The flowers are extremely fragrant and the petals of great substance. However, the most noticeable differences between *Talauma* and the closely related *Magnolia* are in the fruits. Those of *T. mexicana* are heavy and hard; the outer covering is thick and woody and is made up of segments which are dove-tailed together into a "mosaic." When the fruit is ripe and the "shell" dries slightly, the segments fall apart, the bright red-coated seeds being exposed. A nurseryman tells me that the pulp should be removed from the seeds of *Magnolia* before sowing; seeds eaten by birds would be distributed in this condition. Because of the high crowns of the trees in the forest, seed collecting is often a problem. On one occasion we obtained fruit from monkeys. A band was feeding on the fruit one hundred feet above us and, in the improvident manner of parrots and monkeys, would sample one fruit, drop it, and go on to the next. I am sure

Below. *Talauma mexicana* growing at an altitude of fifteen hundred feet in the rain forest of eastern Oaxaca.



Right. The basal part of the trunk of *Talauma mexicana,* showing the typical buttressing.

the monkeys did not take aim, unless to be helpful, but it was a sporting event. At various times I have distributed seed to institutions and to individuals.

The cultivation of *Talauma mexicana* will probably be limited to frost-free areas. I still wish to introduce the tree to gardens in the Oaxaca valley. With this in mind, I sowed forty seeds in a flat in Mitla, Oax. The seeds germinated one hundred per cent but later, when the town reservoir ran low, the young plants succumbed to well water.

In November, 1964, I traveled in the State of Chiapas, taking advantage of facilities offered by two highways under construction, north toward Tabasco. North of Ocozocoautla, Chis., there are still considerable areas of virgin rain forest, and the new road is making these areas more accessible. *Talauma mexicana* is common in some places, here. About thirty-five kilometers (about twenty-two miles) from Ocozocoautla, a scattered group of this species growing near the highway is conspicuous because of the high gloss of the evergreen foliage.

In Ocozocoautla, I learned that a mixture of the ground dried petals of *T. mexicana,* ground parched red corn, chocolate, cinnamon, and sugar is made into small balls. These are taken, in water, on an empty stomach for "heart ailments." The dried petals are also used to flavor chocolate drinks.

Little seems to be known about the economic value of *Talauma mexicana.* Meanwhile, the trees continue to go up in the smoke of milpa burnings.

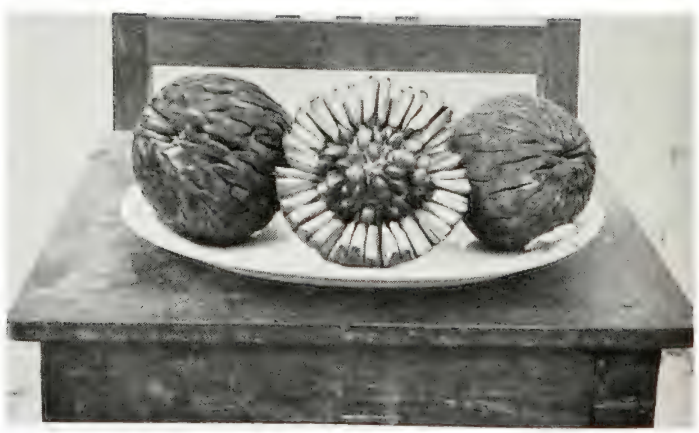
Talauma mexicana is one of the trees which those who participate in the Garden's Guatemala Tour will see when they visit that country. Dr. Julian Steyermark mentioned *T. mexicana* in his article in *The Garden Journal,* January-February, 1965. D.E.H.

Top left. The flower bud of *Talauma mexicana,* a day or two from opening.

Center left. A fully opened flower, the second day. The flower varies in size and shape, its petals usually being much broader than shown here.

Bottom left. Flower-bud bisected longitudinally to show internal structure.

Below. Ripe fruit of *Talauma mexicana.* The woody covering is in dove-tailed sections which shrink and fall apart in drying. The seeds have the fleshy red covering and threadlike attachment, typical of *Magnolia.*



ONCIDIUM ORTHOSTATES

By LINCOLN ADDERLEY

Mr. Adderley, a gardener, takes care of the orchid collection at The New York Botanical Garden.

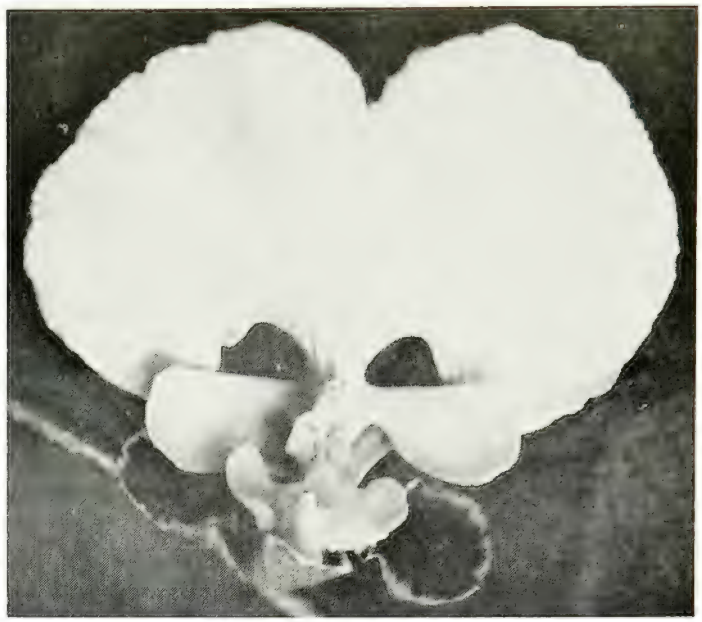
DURING AN EXPEDITION to Venezuela in 1959 with Dr. J. J. Wurdack, one of the most interesting experiences was the exploration of the Siapa River, and one of the many beautiful orchids found on the trip was *Oncidium orthostates.*

The Siapa River, deep in the backwoods of Venezuela, is part of the great maze of small rivers that empty into the Casiquiare and the Guianía Rivers, both flowing into the Rio Negro, which runs into the Amazon, and the Orinoco.

The Siapa River was of great interest because it had not been previously collected. Every step of the way was a real challenge. I remember the afternoon so vividly when our head guide Silverio and I, exploring a few miles in front of the big dugout *(chalana)* in a smaller dugout, rounded a bend in the river and the beautiful hills and mountains presented themselves. This was a relief, for we had been collecting in the lowlands for many weeks, and the prospect of climbing some of those hills and mountains was exhilarating. It was on this same afternoon that I realized how marvelously attuned were our men to their surroundings. Silverio spotted a "baba," a five-foot crocodile, some distance out in the river—I could easily have swum over the reptile without seeing it. He slowed the boat and cautiously approached against the current. He kept pointing, I kept looking and asking, *"Donde?"*—Spanish for where. It was not until we were almost on top of the crocodile that I saw it. I had seen many of the big caimans along the river's edge with just the eyes shining in the muddy water. But this little fellow — they grow to only five or six feet — was apparently having dinner, marvelously camouflaged against a tree trunk and rock in the water and facing the current with his mouth wide open. Smaller fish moving downstream were attracted by the brilliant color lining the inside of his mouth and swam in to explore. When there was a good morsel, he clamped shut and swallowed! Incidentally, we were not just playing games. Silverio decided this was going to be dinner! I had been teased throughout the trip about the various native foods and now the delicacy, "crocodile tail," was on the menu. It is good, I must admit.

We landed our quarry, and I examined it from head to tail. The reptile, which had been shot directly in the head, was supposed to be dead, but the mouth could still open and close. I had forgotten for the moment that it was a reptile and that the secondary brain, in the tail, was still functioning.

We continued upstream, spotting patches of foam as we moved along, which indicated that there were rapids ahead. The patches of foam became more frequent, and we could hear the sound of rushing water. We approached as close as we could to the rapids, looking for a possible opening through which we might be able to pass. Near the rapids we ran into the greatest swarm of flies, other than "black flies," that we had encountered on the entire trip. So thick were they that we could hardly open our eyes as the canoe pushed forward in the strong current. Fortunately they did not bite.



Oncidium orthostates.

After looking the situation over, we decided it was too big a problem to tackle that afternoon, especially since it was getting late. We headed downstream to meet the big *chalana,* in the meantime looking for a suitable spot to camp for the night. The rapids would have to wait for the next day.

Bright and early the following morning we headed for the rapids only to discover that it was impossible to get the big dugout through them. We were able, however, to use the small dugout and so collected a few miles upstream. Establishing camp at the base of the rapids, we collected the area for a week. This turned out to be one of the most delightful collecting experiences on the trip. Only a very small area, however, could be touched in such a short period. When the time came to leave, it was almost painful to do so, being aware of the beautiful orchids on the hills and mountains. We were able to climb only one small mountain and several small hills. During our trek up that mountain we passed through a cloud forest which was "out of this world." As we were passing through, the clouds swept in, enveloping us and everything around us in mist. Delicate filamentous ferns and mosses dangled from everything.

On one of these daily excursions in and around the foothills I collected *Oncidium orthostates.* Plants were growing semiterrestrially at the base of shrubs and small trees with the root-system taking full advantage of tufts of grass, half-rotted leaves, twigs, and so on. In more exposed areas, the roots were growing over lichen- and moss-encrusted rocks. The plants were not in flower when I collected them, but the six-foot flower-spikes had shot up through the shrubs among which the beautiful flowers had obviously played in the breeze and attracted, most likely, some of the lovely butterflies so common in the area. I do not know whether bees or butterflies pollinate this flower, but because of the magnificent lip, with its glimmering sheen so much like the sheen of the butterflies, I am led to believe that the butterflies might easily be attracted to it.

Although *Oncidium orthostates* had finished flowering some time previously, flower-spikes were still green and active, not producing seed-pods but plantlets from the upper portion of the spikes. In cultivation I find that if the old flower-spikes are left on the plants, they will continue to produce plantlets from the apex down. When the plantlets near the apex are removed, the eyes at nodes directly below them will produce new plantlets. This production of plantlets will continue until almost all the eyes on the spike will have developed plantlets—an interesting mode of vegetative propagation not commonly found in oncidiums. This continual production of plantlets does not seem to burden the plants excessively, or as much as a seed-pod. In nature, however, only one to three apical nodes develop plantlets; and as these grow and increase in weight, the long spike bends toward the ground where the roots take hold and the plantlets quickly establish themselves. The old spikes remain active for several years, plants continuing to grow normally and producing new flower spikes.

Although like a great many oncidiums, *Oncidium orthostates* grows semiterrestrially, I find that it does well in the conventional potting media—bark, a bark mix, and osmunda.

It produces a three-inch pseudobulb with either one or two coriaceous leaves from ten to twelve inches long and one to one and one-half inches wide. The leaf margins are finely serrated. There are two cataphylls, the one from which the flower-spike emerges being the longer of the two. The terete flower-spike, from five to six feet long, appears about the first of September and carries blooms from the end of October through December. They are produced only on the terminal twelve inches of the spike. Occasionally one or two lateral branches are produced which flower after the initial flowers have passed. The individual flowers are carried on a green pedicel one inch long.

The greenish yellow sepals, which are one-half inch long and one-fourth inch wide, are concave with the dorsal sepal more so than the lateral sepals. They are marked apically with a solid blotch of maroon, giving the appearance of a solid color at a distance. The background color, however, can be seen along the margins and at the base. The lateral petals are a little broader than the sepals and somewhat more yellow.

The outstanding reniform lip is bright canary-yellow with a waxlike texture which glimmers in the sunlight. The midlobe is one and one-half inches across and deeply retuse with a distinct barb on the under side. There is an area of reddish purple spots along the midvein on the under side. The falcate lateral lobes, canary-yellow without any sheen, one-half inch long by one-fourth inch wide, point backwards.

The bilobed crest is raised on a keel and finely spotted with red. There are three distinct spots at the base of the crest.

The one-fourth-inch column is green apically, becoming whitish at the base, and bears two beautiful yellow, ear-shaped wings (auricles) which measure one-fourth inch long by one-eighth inch wide and extend well above the anther.

There is a varietal form of *Oncidium orthostates* in which the sepals and petals are barred and blotched with dull red —instead of solid maroon—and the lateral lobes of the lip, while they are still falcate, are not recurved but stretch out over the upper margins of the midlobe. The spike in this form does not exceed three and one-half to four feet in length, and the flowers are produced on the apical fifteen inches of the spike.

PANHANDLE POSSIBILITIES IN ALASKA

By VINCENT J. BOUCHER

This article, in which Mr. Boucher relates experiences, past and present, in homesteading in the forty-ninth State, was contributed to *The Garden Journal* through the interest and cooperation of Mrs. Lester O. Gore. Mrs. Gore who is active in the federated garden clubs of Alaska, has lived there since 1915, presently in Ketchiwan, previously in Juneau and Nome.

IN THE YEAR 1868, before a rough and random gathering at Sitka, Alaska, just one year after the United States had purchased the territory from Russia, one Toy-a-att, an Indian Chieftain rose and spoke. The speech so impressed the more discerning among the audience that a copy was sent to Puget Sound where it was published in *The Weekly Argus,* at Port Townsend, then the seaport and principal city of a sprawling territory which, in due course, became the State of Washington.

I have read the speech, and on occasion reread it, and always with admiration. If it has a fault it is, I should say, that the old Chief did less than justice to the original culture of his people. It was a remarkable culture for the reason, among others, that it protected the Panhandle people at all times from the seasonal period of starvation (usually late in winter) which tribesmen elsewhere accepted as a matter of course. It provided, moreover, abundant leisure during the winter which favored a pronounced development of the arts: an elaborate ceremonial life, with music and dancing; weaving with mountain goat's wool; forging of native copper; basketry; and especially the art of carving, not only with the plentiful wood of the region but with mineral substances, some of the hardest being among them. All this was accomplished without resort to cultivation of the soil.

The original culture was a sort of marine nomadism, with summer camps and winter villages, which provided food in abundance, and yet the diet was less than ideal. It lacked starch, the Indians relying heavily on marine oils as energy foods. Seal, salmon and eulachon oils were favorites. And since these were often, if not usually rancid, it is quite possible that their use over the years exerted an unfavorable influence on the general health. Local chieftains of my ac-

quaintance are of this opinion and say that the old records tell of many a warrior who, magnificent in youth, suffered terrible physical breakdown in early middle age. The old-time Indians themselves seem to have been aware of their dietary imperfections, for a very early consequence of their contact with the white men's ships was the adoption of a simple sort of gardening and the cultivation of potatoes and turnips. Once established, the growing of these items continued until regular steamship service made it possible to buy produce at the village stores.

Soon after the transfer of the territory to the United States, certain adventurers came to Alaska. Many of them planted gardens. These gardens met with varying degrees of success, but some did well and at Sitka attracted the attention of John G. Brady, a missionary teacher, who remained to become Alaska's first governor. Under date of May 6, 1878, he noted, "Several gardens have been successfully cultivated in Sitka. Cabbage, cauliflower, potatoes, carrots, leeks, celery and peas yield well. One cabbage weighed 27 pounds. Though Alaska is no agricultural country, yet there is plenty of land for growing vegetables for a vast population. This can be easily cleared and cultivated. The food of this coast is secure [having previously mentioned the abundance of fish and game] unless the Pacific Current changes and rain ceases."

Once I would have felt positive that this cheerful assurance was the result of viewing the Panhandle scene through rose-colored glasses; high-powered ones, at that. Now I'm not sure, granted, of course, the wish and the will and the energy and the skill to convert potentiality into actuality.

It was John Brady's influence, I suspect, together with that of tireless Sheldon Jackson, another missionary, which helped persuade Congress to approve a program of Agricultural Experiment Stations for Alaska. This was decidedly an achievement for, in John Brady's day there was a cross current of forces which led to immense confusion. Some maintained that in view of the price paid, Alaska was a "present"; others complained bitterly and loudly that the purchase price was money worse than wasted. And behind the scenes, powerful interests, whose managements knew the current value of the vast country and guessed shrewdly at its potential, exerted all the influence at their disposal to disparage Alaska and delay its settlement. None the less, in 1897, thirty years after the transfer, a reconnaisance expedition was sent from Washington, D.C., with Sheldon Jackson in the party, and spent the summer in Alaska. The following year work was begun at the site of the first of the proposed Experimental Stations, the one at Sitka.

Heading the Experimental Station program and, for some thirty years agronomist in charge, was C. C. Georgeson, referred to on occasion as "the Burbank of the North." Dr. Georgeson, hardly a Burbank, did find time for certain hybridization and selection, but there were other demands having to do with means and methods suitable and practical for the pioneering settlers' use. The whole program was experimental, involving a large element of trial and error. To these labors Dr. Georgeson gave the best years of his life, and to him many were indebted for published information which, through the years, I have found practical, reliable, and indispensable.

At about the same time the Sitka Station was getting under way, a lone homesteader appeared at the sawmill and salmon cannery village which was to become, later on, Alaska's first city, Ketchikan. He was a tragic figure, a man who had lost his entire family in a hurricane of flame which devoured the town of Hinckley, Minnesota, during the terrible forest fires. He sought to establish himself in the wettest locality in the rain-drenched Panhandle and there to demonstrate that produce could be grown under conditions considered impossible.

On Gravina Island, west of Ketchikan across a mile-wide channel, he staked out a homestead and went to work. He labored mightily and proved in time that the pessimists were wrong. His cabbages found favor with the stalwart fishermen who manned the halibut schooners, and he was able to dispose profitably of considerable quantities to the fleet, season after season. I have an old photograph of F. H. Fiedler's clearing across the back of which some official has written, "The only homestead seen in Alaska on which anybody has pretended to do any work." No doubt this was intended as a compliment through the word "pretended" is not too well chosen. Fiedler didn't pretend—he gave his venture all he had. When his strength failed him eventually, he did not live very long. "Fiedler's Place" lay idle for several years. Then, in the depths of the depression, I decided to carry on with what this Panhandle pioneer had begun.

The remarkable hard-to-burn house that F. H. Fiedler built and the grape vine he planted at the corner. Potatoes are blossoming in the foreground.
Right. Fiedler's clearing on Gravina Island, looking east toward Renilla Island.

So it was that in the autumn of 1935 I found myself on the beach at Gravina Island, with a devoted family, an assortment of pans and pots, bedding and books, a few hand tools, and two sturdy oar-driven boats. I had a deep love for the awesome Alaskan coast, and a great liking for good and leisurely reading. I had a certain natural aptitude for observation, and some degree of practice. I had a useful acquaintance with the principles of woodcraft and seamanship and a working knowledge of the frontier arts, as well as an axeman's eye and an oarsman's shoulders. I've needed all.

As a means of gainful occupation, I had a stumpy clearing of perhaps two acres which included four different kinds of soil: moss peat; woody peat; dry muskey (a mineral-peat-glacial mixture); and an odd soil which looks like loam but isn't. All were "Job's turkey" poor. All needed attention. Fiedler's drainage system had ceased to function—and from the sky above there normally fell from twelve to sixteen *feet* (not inches) of rain per annum. The prospect wasn't too alluring, and I doubt that I would have had the courage to tackle it, except that Fiedler had blazed the trail ahead.

That autumn of 1935 was a long time ago. Pausing for a brief revaluation, my chief emotion is one of surprise that I am still here. Many have left since the wars, and I am amazed that I continue to anticipate each year's activities with lively interest and that the work is, season after season, a pleasure. It is surprising, too, that this odd soil can be effectively reconstructed and rendered highly productive without recourse to other means than those naturally present.

Assuming the ground is roughly cleared, drainage is the next requirement. Fiedler, at very considerable expense, drained his clearing with concrete tiles; these, subjected to the continual flow of highly acid water, had distintegrated. I couldn't afford more tiles, but I found that I did not need them. Dr. Georgeson recommended wooden linings for drainage ditches. The ditches, he said, should be dug as deep as possible. I've found thirty inches the minimum, and twice that is better. Three good-sized poles are placed in the bottom, another trio of poles on top, then a plank covering (driftwood planks did service) the sod, grass side down, followed by the final filling. At Sitka such ditches, he reported, were effective after twenty years. Some of mine have served longer than that. The system is subject to variation. Instead of poles, I've used split cedar timbers, like old-fashioned fence rails, with good results. And I've sometimes covered these with old, slick-paper magazines instead of planks. On one occasion, being in a hurry, I lined a ditch with a length of ordinary poultry wire, rolled tight into a cylinder about six inches in diameter, covered with old magazines, and earthed over. It has functioned perfectly. The wooden linings serve best in peat. I had some trouble with them in the dry muskeg area—the mineral content tends to cause silting.

I've never tested the ground with litmus paper. After seeing what had happened to Fiedler's tiles, it didn't seem necessary. Also the ground, in its natural condition, is everywhere overgrown with acid-loving mosses and blueberry bushes, not to mention wild cranberries and crowberries. And Dr. Georgeson had stressed soil acidity and recommended the use of lime—freshly slaked quick lime at the rate of one ton per acre, though some of the Sitka Station ground required more than that. "Lime," he said, "makes the difference between a crop and no crop."

I have never used quick lime. It has to be bought, is somewhat dangerous to handle, and is fussy to slake. I was fortunate in knowing certain details of the successful reclamation (after centuries) of the Kentish moorlands in England. Quick lime (freshly slacked) was used with passably good results, but the best material for sweetening the soil was found to be sea sand containing a high proportion of marine shell material. I knew enough about shell fish to suspect that the superior results obtained by using the sand-shell mixture were due, in large part, to the presence of trace minerals in the assorted shells. I consulted the chemist in charge at the Fisheries Laboratory in Ketchikan. While he was not in a position to make analyses of the shell materials, he gave me his opinion which was that in all probability the deposits of mixed shells hereabout contained traces of everything in the sea water, which in turn is known to contain every element thus far found in the land. Reassured, I began to dress Fiedler's clearing with this "beach lime" and I've been applying it, as opportunity offered, ever since.

During the first growing season (1936) the area I could properly prepare was limited, but the work was thoroughly done. Shell was applied at the rate of about four hundred pounds (net weight) per square rod, sea weed (rock weed, *Fucus*) at the same rate, and planting was done without waiting for the sea weed to disintegrate. The summer was excellent, more sun than usual; the yield was surprisingly good, so was the quality of all produce. I know now that the freshly collected "beach lime" is a fertilizer as well as a soil sweetener, and I have learned that soda and potash are the "twins of chemistry." In soils well supplied with humus, those plants which are naturally potash feeders can utilize the soda. This accounts for the fact that the rock weed (a soda kelp) gave excellent results that season with cabbages and potatoes.

In digging potatoes I had another surprise—the lumpy peat of the spring had become soft black earth which sifted readily between the fingers. Dr. Georgeson had stressed that conditions of temperature, moisture, and acidity favored the formation and retention of peat. He was right! Yet with temperature and evaporation rate unchanged, simple drainage and the application of ample shell material (calcium carbonate, plus trace minerals) had reconstructed the peaty ground. I was gratified.

For several seasons I relied chiefly on rock weed as fertilizer, applying the material fresh, as Dr. Georgeson recommended, at the rate of some forty tons per acre. After a time, though, I had the impression that an excess of soda ash was building up in the soil, despite the heavy rainfall, so I began using the "long kelp" *(Nereocystis lutkeena)* as a fertilizing mulch on the growing crops. This gave good results, but since the nereocystis is not available until early summer, and since that is a busy season, I sought a method of storing it in autumn for use the following spring. After various failures I hit upon the method I am now using. Any structure with an impervious floor and a tight roof can be used as a storage place. First a layer of reconstructed soil about one foot in depth is placed on the floor, then a layer of chopped kelp a foot deep, followed by another layer of

soil a foot deep, and repeated as desired. The kelp contains enough water to saturate and incorporate the mass by the time spring arrives. By then the original bulk is much reduced. The material is not offensive, is readily handled, and gets excellent results. I concentrate the fertilizer in the row and keep it near the surface, since with so much rain and so little hot sun, the movement of the soil water tends to be down.

After some years of experience, I began adding starfish to the kelp in storage—to five tons of wet kelp, a ton of starfish. There are a dozen kinds of this fish in the water here, but my favorite is the huge sunflower star *(Pycnopodic helidalhoids)*. Of these I use about two thousand each season, some started with the kelp, others applied directly to the ground from late winter on and lightly earthed over. They break up quickly and cleanly and are wonderful plant food for cabbage, cauliflower, and carrots.

The Panhandle is an awesome land, one of very positive moods. Often landscape and seascape are studies in gray. Again, in the rosy dawn or under the magic of hours-long summer sunsets, all is fairyland. In winter, with a sickle moon in a steel-blue sky set with unnumbered scintillating stars and lit with the brilliant, shifting, twisting aurora borealis, the scene is one of magnificence and majesty. And yet, oftener than not, the Panhandle is a somber country. In autumn especially, for it is land poor in native ornamental plants.

Dr. Georgeson was quick to recognize this deficiency, and through the years he introduced and established gratifying numbers of ornamental shrubs. Three types of honeysuckle now flourish, *Lonicera tartarica, L. japonica,* and *L. thibetica;* also rhododendrons; *Hyrangea paniculata; Cornus siberica; Ribes sanguineum;* cotoneasters; Siberian pea-tree *(Caragana arborescens); Diervilla (Wiegelia) rosea;* and *Potentilla fruticosa.* He found members of *Rosa rugosa* best adapted to the Panhandle conditions, and my experience agrees. Other roses can be grown but tend to be less hardy.

Meadow sweet and perennial phlox thrive with scant attention, and the same can be said of foxgloves, delphiniums, and the perennial batchelor buttons. Bulbs are also very much at home—Dr. Georgeson considered their production on a commercial scale as being a very definite possibility. Narcissi, hyacinths, tulips, English, Dutch, and Japanese irises, gladiolus, and the Regal lily did well at Sitka. I have most of these flowers here on the Island, and also crocuses.

The Panhandle is primarily occupied by conifers, and yet other trees will grow if planted. In this immediate locality I have observed maples, cottonwood, holly, weeping willow, French pussy willow, weeping birch, mountain-ash, and even a sugar maple brought some years ago from Indiana. Fiedler was greatly interested in trees and introduced a number. Some of the rarer ones disappeared during the interval after his death, but specimens of hawthorne, flowering quince, larch, balsam fir, mountain-ash, black walnut, and white ash are established and making vigorous growth. He set out an orchard which demonstrated that the yellow transparent apple is capable of producing good yields of excellent fruit in this locality; the other trees did poorly except for the crabapples which do well in some seasons. The blackberries and raspberries suffer from diseases which finally led me to destroy them, but we have an ample supply of red currants and gooseberries from the bushes Fiedler planted. And we have strawberries, Alaska Hybrids, each season. One ancestor is the wild Yakutat berry, the other of unknown origin found growing in an abandoned mining camp at Hollis. Fiedler planted a Concord grape vine which by the time we came had reached the eaves of the house. It never ripened its fruit but lived on for years, until late freeze one April proved too much for it. In the main, the vegetable plants which thrive in the cold dampness of spring and early summer in more northern localities are the ones best adapted here. These are table beets, Swiss chard, parsnips, lettuce, radishes, and parsley; also bush beans, horse beans, and Zucinni squash. Other squashes, pumpkins, cucumbers, corn, and tomatoes usually fail, unless they are grown in greenhouses.

Many of the favorite seasoning herbs can be grown in the Panhandle; among them mint, sage, thyme, catnip, anise, and dill. I have grown garlic, white onions (from seed), and shallots.

Some time ago I conducted a four-year experiment with sugar beets, proving that the choice strains which produce seed very sparingly farther south produce seed in abundance here. G. W. Wheatley, at whose request the experiment was undertaken, hoped to use this northern-grown seed to influence the heredity of the seed strains grown for commercial distribution on the extensive beet seed farms operated in Oregon by the Spreckles Sugar Company.

I have grown excellent cabbage seed by the very simple method of setting out the stumps of cabbage used during the winter. One year I tried the Dutch method which, so far as I know, has never been used on a commerical scale in the United States, because the method requires cool weather and a very high and steady water table during the growing season. These conditions prevail here. A cabbage, wintered over in the cellar, was set out in late spring with the top of the head just below the surface of the soil. The result was a treelike growth, six feet high and almost that wide, profusely set with long, plump, well-filled seed pods. I'll never know the precise yield of seed, because the mice carried off part of the pods while they were drying. But I'll risk a guess, four pounds at least, which might be called a successful demonstration of the Dutch method in the Panhandle.

Difficult-to-grow flower seeds might be produced here successfully. Certainly foxglove, strictly on its own, readily produces viable seed in great abundance.

Once more the north-bound geese! How swift the well-filled seasons! I realize that our life on this Panhandle island has been, by modern standards, a thin life with a pronounced frontier flavor and little financial leeway. And yet rewarding. Living close to the elements often sharpens awareness and deepens appreciation. Both, thus amplified, add to the satisfaction of living. There is the matter of self-reliance, too. Season after season we have managed to finance our simple operations without resource to credit. I've liked that. And there are the "extra dividends," those observations and experiences rare even among those who have spent protracted intervals in the outdoor environment. Of these, I'll mention only one which, incidentally, provided me with a vivid understanding of why it was that falconry remained for centuries the sport of kings. While loading kelp *(Nereocystis)* from one of the inshore beds, I saw a fal-

con (gyrfalcon probably) flush a great blue heron into flight with the every evident intention of striking the quarry down with a blow of its clenched feet. To my surprise, however, (and the falcon's too) the heron proved capable of defense, even while on the wing. By thrusting backward with its formidable beak, it successfully foiled three attacks, meantime gaining altitude of some forty feet above the water.

Angered then, the fierce and feathered huntress rose swiftly to a position perhaps fifty feet above her quarry and some distance to the rear. Then she paused, turned, and came slanting down like a well-thrown javelin. In a split second of contact she struck. I heard the impact of the blow. The heron crumpled and fell straight down, seemingly done for. It was dramatic to say the least—the strategy, the hurtling downward flight, the resounding blow, the crumpled fall. But more followed.

The heron remained on the surface of the water, with both wings held high and vertical and its head carried low, pressed against the shoulders. When the hawk came in for the finish, it thrust, just once, with the speed of a striking rattlesnake. And then, to my amazement, it rose straight up like a balloon until, having gained approximately the altitude from which it had fallen, it leveled off and flapped away along the channel, unpursued. The falcon was hors de combat. That rapier thrust had founds its mark.

Rural America is in the process of startling change. The family farm seems destined to become a thing of the past. Perhaps it has served its purpose. The family garden, though, I like to believe and greatly hope will remain, especially where there are children, most precious in potential of all this planet's creatures. For them, the family garden can open an avenue of awareness of how the green and growing things of earth with all their beauty and fragrance, their endless usefulness, are available to us by reason of the light and power of the all sustaining sun. The broader this avenue can be made, the better.

Exhibit of Wild Flower Paintings

An artist who recorded the beauty of wild flowers was Martha Blow Wadsworth. Her water colors, which have drawn praise from artists and botanists alike for their detail and interpretive feeling, are being exhibited in the Museum and Administration Building of The New York Botanical Garden until May 1, 1965.

Executed in water color and tempera, the illustrations were done mostly in the 1890's. They were bequeathed to The New York Botanical Garden by the late Mrs. Michael Moukanhoff of Avon, New York, who was a niece of Mrs. Wadsworth. Mrs. Wadsworth died in 1934.

The descriptions are given here exactly as they appear on the paintings.

Plate XVI *Liliaceae* Lily Family *Trillium grandiflorum* large white trillium or wake-robin.

Plate XIII *Liliaceae* Lily Family *Erythronium albidum* white dog's tooth violet April 30th.

Plate CVIII *Nymphaeaceae* Water-lily Family *Nymphaea odorata* sweet-scented water-lily July 9 '93.

COMING EVENTS
at
THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500.)

HOUSE PLANT SHOW in the Conservatory—now and until March 28, 1965. 10 a.m.-4 p.m.

"BERNADETTE'S COUNTRY AROUND LOURDES," illustrated Saturday Afternoon Lecture by Alice Dustan Kollar, on March 6, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

CHILDREN'S OUTDOOR GARDENCRAFT. 9:30 a.m. to 12 noon. Starts Saturday, March 6, 1965. —In charge, Mrs. Lillian Weber.

SATURDAY AFTERNOON NATURE WALKS—1:30-3:00 p.m. Starting point, Museum Building. First walk—March 13, 1965. Leader, Mrs. Eleanor Yarrow.

"A BOTANIST IN YOUR GROCERY STORE," illustrated Saturday Afternoon Lecture by Dr. Richard A. Howard, on March 13, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"THE PEOPLE OF SOUTHEASTERN ASIA," illustrated Saturday Afternoon Lecture by J. A. Lukins, on March 20, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

HOW TO PRUNE—10-11:30 a.m. (3 weekly sessions). Starts March 24, 1965. Instructor—T. H. Everett.

"THE ART OF BONSAI," illustrated Saturday Afternoon Lecture with demonstration by Yuji Yoshimura, on March 27, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

HOUSE PLANTS IN SPRING AND SUMMER—10 a.m.-12 noon or 8-10 p.m. (3 weekly sessions). Starts March 29, 1965. Instructor—Louis P. Politi, assisted by Lillian Weber.

THE JAPANESE ART OF BONSAI—10 a.m.-12 noon or 8-10 p.m. (3 weekly sessions). Starts March 30, 1965. Instructor—Yuji Yoshimura, assisted by Juanita B. Schiff and Edna L. Kane.

Members' Evening, April 1, 1965, 8:30 p.m. in the Colonnades Ballroom, Essex House, 160 Central Park south, New York, N. Y.

"LITTLE PAGEANTS OF NATURE," illustrated Saturday Afternoon Lecture by Mr. and Mrs. Philip Bergh, on April 3, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

LANDSCAPE GARDENING—8-10 p.m. (7 weekly sessions). Starts April 6; a second class starts April 8, 1965. Instructors—Arthur Murphy and Ernest Altenheim.

FLOWER AND LANDSCAPE PAINTING IN WATER COLORS—9:45 a.m.-12:30 p.m. (8 weekly sessions). Starts April 6; a second class starts April 9, 1965. Instructor—Edgar A. Whitney, A.W.S.

GARDENING PRACTICE II—10-11:45 a.m. or 8-9:45 p.m. (8 weekly sessions). Starts April 8, 1965. Instructors—James M. Gibb, Robert Russo, assisted by Lillian Weber.

CHILDREN'S GARDEN NATURE STUDY—9:30-11:30 a.m. (8 weekly sessions). Starts April 10, 1965. Instructor—Eleanor Yarrow.

EASTER SHOW in the Conservatory of The New York Botanical Garden, April 10-25, 1965.

"THE GLORY OF GREECE," illustrated Saturday Afternoon Lecture by Ruth H. Smiley, on April 10, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

BOTANY FOR BEGINNERS—10 a.m.-12:00 noon or 8-10 p.m. (8 weekly sessions). Starts April 14, 1965. Instructor—Eleanor Yarrow.

"LIFE IN AND AROUND A BEAVER POND," illustrated Saturday Afternoon Lecture by Angelo d'Angelo, on April 17, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

INTERMEDIATE AND ADVANCED BONSAI—10 a.m.-12 noon or 8-10 p.m. Starts April 20, 1965. Instructor—Yuji Yoshimura, assisted by Juanita B. Schiff and Edna L. Kane.

GARDENING WITH WILD FLOWERS—10 a.m.-12 noon (6 weekly sessions). Starts April 21, 1965. Instructor—Lucille Kopp Blum.

"HOW TO FIND WILD ORCHIDS," illustrated Saturday Afternoon Lecture by Mr. and Mrs. George A. Elbert, on April 24, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"BOTANY RAMBLES ALONG THE ROCKAWAY SEA SHORES," illustrated Saturday Afternoon Lecture by Dr. Theodore Kazimoroff, on May 1, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

ANNUAL MEETING of the Corporation of The New York Botanical Garden in the Snuff Mill, May 3, 1965.

SPRING GARDEN TOUR sponsored by the Advisory Volunteers—to Boscobel Restoration, Garrison-on-Hudson, New York, and gardens in that area—May 6, 1965.

"FOSSILS ARE FUN," illustrated Saturday Afternoon Lecture by Dr. Herman F. Becker, on May 8, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

FIELD BOTANY (Cryptogams). Eight weekly sessions, starting May 10, 1965. See Educational Program for dates and hours. Instructors—Eleanor Yarrow and Elizabeth C. Hall.

Admission to Saturday Afternoon Lectures, 25 cents; free to members of the Garden (upon presentation of membership card).

Nature Walks, fee $1.00 per person

For fees of the various courses, see the Educational Program.

PROMINENT HORTICULTURIST SLATED FOR

MEMBERS' EVENING

A world-famous plant explorer and expert on Guatemalan plants, Dr. Wilson Popenoe, will be the featured speaker at the annual Members' Evening of The New York Botanical Garden, at 8:30 p.m., April 1, 1965, in the Colonnades Ballroom of Essex House, 160 Central Park South.

The hour and a half program will include the television film, "Eye on City Parks," about The New York Botanical Garden; color slides on Guatemalan plants shown by Dr. William C. Steere, the Garden's Director, who will introduce Dr. Popenoe; and exhibits of Guatemalan plants by the Horticultural Department of the Garden and of Guatemalan handicrafts by the Advisory Volunteers. Members are permitted to bring one guest.

An article by Dr. Popenoe appears on page 44 of this issue of *The Garden Journal.*

NEWS, NOTES and COMMENTS

"A Plant Survey of the Planalto de Brazil" is the title of a new long-term exploration-project of The New York Botanical Garden, the first phase of which was successfully carried out from July to November, 1964. The project director, Dr. Howard S. Irwin, Associate Curator of The New York Botanical Garden, was accompanied by Dr. Thomas R. Soderstrom of the Smithsonian Institution. Regions visited included the upper drainage of the Rio Xingú in the State of Mato Grasso, the Serra de Carapó in the State of Goiás, and the vicinity of Brasília in the new Federal District. In addition to the nearly twenty-seven hundred numbers of herbarium specimens collected, numerous wood samples and cytological collections were taken, and about two hundred and fifty photographic exposures were made.

The project is supported partly by funds from the National Science Foundation and is being undertaken in collaboration with the Departmento de Botânica of the Universidade de Brasília, particularly with Dr. João Murça Pires, Department Chairman. During the coming year Dr. Irwin and his family intend to take up residence in Brasília for about twelve months. In this period intensive field work will be carried out in the States of Goiás, Minas Gerais, and Bahia. Particular attention will be given the participation of botany, students of the Universidade de Brasília and other Brazilian institutions. At least one graduate student from The New York Botanical Garden is expected to participate.

Five-Volume Series on Wild Flowers. Dr. Harold W. Rickett, Senior Botanist, has seen proof on all the color-plates for the first volume and about half of the text is in galley-proof. He expects to go to Ipswich, England, in March to consult again with W. S. Colwell Ltd. Then later he will go south for the second volume on wild flowers of the southeastern United States, and perhaps westward during the summer.

Charles Johnson, the photographer, has started on his tour of photography—this time for the fifth volume, the Southwest, and thereafter for the fourth volume, the Northwest.

"Septemics—Are they the Answer to Garden Pest Control?" by Dr. P. P. Pirone, Senior Plant Pathologist, an article in the July, 1964, issue of *Horticulture,* has been included in the list of the most significant literature for gardeners during that year and was reprinted in the winter issue of *Plants and Gardens* published by the Brooklyn Botanic Garden.

The January, 1965, issue, of *U. S. Catholic* carried a six-page picture-story about Dr. Pirone's activities at the Garden, at home, and in his parish church, our Lady of the Assumption, from which the following is quoted: "Dr. Pat Pirone, Senior Plant Pathologist at The New York Botancial Garden in the Bronx, is a man of many responsibilities and interests. Besides caring for twelve thousand different plants—trees, flowers, and shrubs from all over the world, he is in charge of research studies on plant diseases and insect and weed control. As a result of his investigations, he has discovered many new species of bacteria which attack ornamental plants, and he has uncovered several types of fungus diseases in trees. His fame as a plant pathologist makes Dr. Pirone's advice sought after by large corporations and individual citizens, and he is an important source of information to the United Nations, where he is consultant on landscape maintenance.

"During the year Dr. Pirone makes many personal appearances on radio and television and does a good deal of lecturing. Two of his books (he has written four) are best-selling standard works on plants, and he has contributed hundreds of articles to scientific and garden journals. A number of plants have been named after him—a prize-winning dahlia and a European ash, *Fraxinus augustifolia* 'Doctor Pirone'—while another dahlia has been named after his wife Loretta.

"In addition to his wide-ranging activities as plant pathologist, Dr. Pirone spends much time working in his parish, Our Lady of the Assumption in the Pelham Bay section of the Bronx. He played an important role in raising half the cost of the construction of the parish's new church and supervised the landscaping of the grounds. After its dedication in 1961, he turned his attention to the parish's educational fund, which is sponsored by Francis Cardinal Spellman of New York.

"All of Dr. Pirone's four children have inherited their father's love of plants, but his eldest son, Tom, is continuing his father's profession most closely as an associate professor in plant pathology of Louisiana State University, where he specializes in virus disease. He recently developed an antibiotic from cauliflower seeds which is effective against plant and animal bacteria.

"As a scientist and a Catholic, Dr. Pirone feels that there is harmony between the scientific and the spiritual in his life. He finds no conflict between science and religion. "Each one of us," he has said, "would have more peace of soul, and the world would be far better off, if we thought as much of prayer as we do of science. Lack of religion is a greater menace to our civilization than a thousand atom bombs. What we are and what we accomplish are primarily dependent on what talents God has given us."

Clitocybe illudens in nature is a poisonous, luminescent mushroom. The mycelial phase of this particular culture has been maintained in The New York Botanical Garden laboratory since 1949, when it was obtained from Dr. Ross W. Davidson of the United States Department of Agriculture at Beltsville, Maryland.

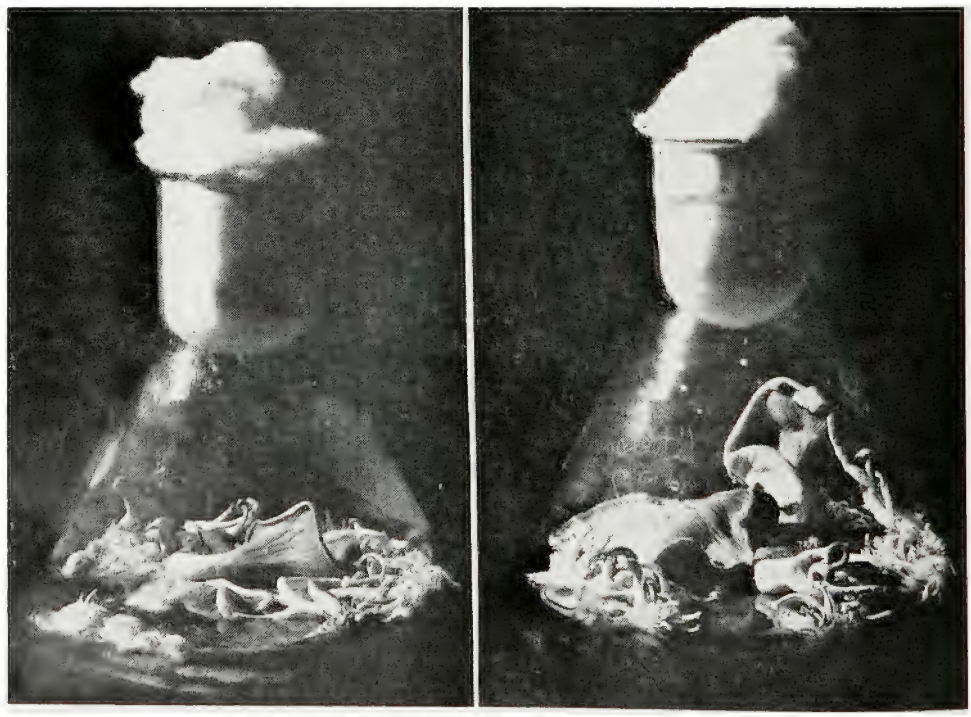
Production of sporophores (fruiting bodies) in culture is of scientific interest from taxonomic, genetic, and biochemical points of view, and is at present being attempted in this laboratory. Although studies of fruiting conditions for *Clitocybe illudens* were planned, these particular sporophores represent simply a happy accident. The cultures were being grown to obtain particular metabolic products, the chemistry and biogenesis of which are being investigated. MARJORIE ANCHEL

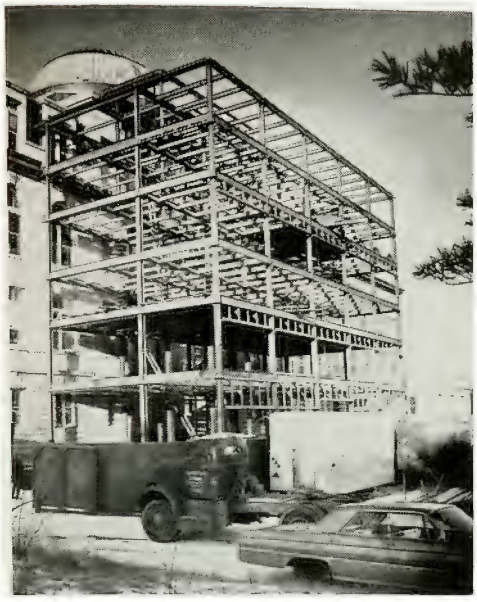
Walter Singer, Staff Photographer, has received this notice: "The Men's Garden Club of New York voted you to be an Honorary Member as a small token of its great esteem for you and its gratitude for your generous assistance over the years and for your forbearance during our annual slide-show contests." Only three others have been similarly honored.

Henry O. Whittier came to the Garden in August, 1964, as a graduate assistant to Dr. William C. Steere, the Director. He will work on Antarctic mosses under Dr. Steere's grant from The National Science Foundation.

After completing his Master's Degree at Miami University, Oxford, Ohio, Mr. Whittier served as an instructor in botany at the University of Hawaii from 1962-1964, and spent

Fruiting bodies of the Basidiomycete *Clitocybe illudens* growing in culture.





Left. The steel structure of the Harriet Barnes Pratt Library Wing at the rear of the Museum and Administration Building of The New York Botanical Garden.
Above, a construction worker perches on a steel girder while he makes frames for the concrete flooring.

three months in the Society Islands where he collected bryophytes before coming to New York. His wife Sally and new daughter Rebecca Jo will join him this summer.

Seminars for Staff and Students. At the seminar on December 10, 1964, Dr. Stanley W. Greene of the Department of Botany, University of Birmingham, England, spoke on "Studies in Antarctic Botany" and at the seminar on January 7, Dr. Hiroshi Inoue of the National Science Museum, Tokyo, Japan, showed a film on the life history of *Marchantia.* A print of this film has been presented to The New York Botanical Garden.

Dr. Julian A. Steyermark, Research Taxonomist of the Instituto Botánico, Ministry of Agriculture, Caracas, Venezuela, and Visiting Curator of The New York Botanical Garden, showed slides on "Botanical Exploration of Auyan-tepui," to the staff and students on February 17, 1965.

Visitors to the Garden

Dr. Hiroshi Inoue, Research Officer at the National Science Museum in Tokyo, was our official visitor on the United States-Japan Cooperative Scientific Programs. Arriving at New York on October 23, 1964, Dr. Inoue worked in our Cryptogamic Herbarium on *Hepaticae* until November 30. He returned to the Garden around the Christmas holidays to pay a short visit before departing for Tokyo.

The United States-Japan Cooperative Scientific Programs are one of the most important scientific operations approved by both the President of the United States and the Prime Minister of Japan. The programs cover not only botanical fields, but aspects of natural history and physico-chemical fields. Many Japanese officials are expected to visit this country and scientists from this country to visit to Japan.

Dr. B. S. Mehrota, University of Allahabad, Allahabad, India.

Dr. Geneva Sayre, Russell Sage College, Troy, New York.

Dr. William Denison, Swarthmore College, Swarthmore, Pa.

Dr. Charles Hodges and Dr. D. H. Marx, U. S. Forest Service, Durham, N. C.

Dr. W. A. Campbell, U. S. Forest Service, Athens, Ga.

W. M. Tiffany, University of New Hampshire, Durham.

Dr. Wesley M. Tiffany, University of Boston, Mass.

Dr. Rolf Singer, University of Buenos Aires, Argentina.

Dr. Harvey A. Miller, Miami University, Oxford, O.

Dr. George Schumaker, and students, Harpur College, Binghamton, N. Y.

Dr. Arif El-Ani, New York State Health Department, Albany.

Dr. Emanuel D. Rudolph, Ohio State University, Columbus.

Dr. Dorothy S. Ginghof, Albert Einstein College of Medicine, New York, N. Y.

Dr. Gabriel Kornis, Chemistry Department, University of Western Ontario, London, Ont.

Dr. Hitoshi Takeshita, who had been a visiting Research Associate, in Dr. Marjorie Anchel's Laboratory for one year, has gone back to Japan.

Torrey Botanical Club. At the annual meeting and banquet on January 19, 1965, Dr. Frank Lier of Columbia University delivered his presidential address, "Plants of the Maritimes."

The meeting on February 16, 1965, was held at Fordham University when Dr. James E. Alexander of Fordham University gave a talk on "Deep Sea Ecology." The March 2, 1965, meeting was held in Schemerhorn Extension, Room 760, at which Dr. Arnold H. Sparrow of Brookhaven Laboratories discussed "Radiosensitivity Studies with Plants."

Following are the talks scheduled through spring, all to be given in Schermerhorn Hall, Columbia University: "Trends in Palynology" by Grace Brush of Rutgers University on March 16, 1965; "Juvenility and Rejuvenescence in Plants" by Vernon T. Stoutemyer of the University of California on April 6; "Physiology of Selective Pathogenicity in the Fusarium Wilt Disease" by Dr. David Davis of The New York Botanical Garden on April 20; "The Ecology of Pesticides in the Soil" by Dr. D. C. Torgeson of Boyce Thompson Institute for Plant Research on May 4; and "Green Medicine" by Dr. W. I. Taylor, Director of Natural Products of Ciba Pharmaceutical Company, on May 16.

The Annual Forum of Ambler Campus of Temple University was held on January 30 and 31, 1965. Among the speakers on the program were Richard J. Cripps, landscape architect, whose subject was "Plant Materials and Landscape Design," and Elizabeth C. Hall, Associate Curator of Education of The New York Botanical Garden. Miss Hall, a graduate of Ambler School of Horticulture, as it was formerly known, gave a talk on "Garden Books, Old and New."

The Brooklyn Botanic Garden has published a comprehensive *Handbook on Dye Plants and Dyeing.* Notes on plants currently used in dyeing and of historic interest were gathered from England, Japan, Thailand, Norway, Malaya, Lapland, Greece, Morocco, Mexico, and South American countries. The color printing and other illustrations were made possible through the generosity of the New York Unit of the Herb Society of America. The handbook is available at $1.25 per copy from the Brooklyn Botanic Garden, Brooklyn, New York, 11225.

Historic Garden Week in Virginia will be held April 24-May 1. The proceeds from the annual event—this year marks the thirty-second—are used for the restoration of grounds and gardens of historic homes and shrines by The Garden Club of Virginia. So far over $650,000 has been expended for this purpose. Guide book and map may be obtained by writing to Historic Garden Week in Virginia, Room 3, Mezzanine, Hotel Jefferson, Richmond, Virginia, 23219.

The Twelfth Annual House and Garden Tour for the benefit of the Institute of Physical Medicine and Rehabilitation, New York University Medical Center, will be held on May 20, 1965.

The tour will include the homes of Mrs. Walter Rosen and Mr. and Mrs. William S. Lasdon in Katonah, New York; and of Mr. and Mrs. Nathan Allen, Mrs. Lathrop Douglass, and Mr. and Mrs. Edwin J. Beinecke in Greenwich, Connecticut. Information on the tour may be attained from Mrs. Edna Blankfort at the Institute, 400 East Thirty-fourth Street, New York, New York 10016.

The Fourth Annual Clara B. Ford Garden Forum will be held at the Henry Ford Museum-Greenfield Village in Dearborn, Michigan, April 28-30, 1965. Details on the Forum may be obtained from James A. Fowler, Director of Education.

The City Gardens Club will hold its annual showing of gardens and penthouse terraces on May 4 and 11, 1965, from 2:30-6 p.m.

The Third Annual San Francisco Spring Flower Show, to be held in Golden Gate Park on April 2-4, 1965, is sponsored by the San Francisco Chapter of Ikebana International and the San Francisco Garden Club. The dual

themes of "East Meets West" and "Along the Pacific Shores" provide scope for exhibits in the Occidental and the Oriental mode.

The California Spring Garden Show, which operates under authority of the State of California, marks its thirty-third year in 1965. It will be held at the Exposition Building in Oakland on May 1-9.

John Vogley has been appointed the show designer, replacing Howard Gilkey who is retiring at the age of seventy-four. Mr. Vogley, a graduate in landscape architecture of the University of California at Berkeley, where he is an associate professor, and his staff have designed many notable developments.

The National Chrysanthemum Society will hold its twenty-second annual show and meeting at the Governour Morris Hotel in Morristown, New Jersey, on October 22-24, 1965. This year marks the two hundred and fiftieth anniversary of the City of Morristown, and an artistic display of chrysanthemums at the show will be in keeping with the historic city, the site of George Washington's headquarters during the American Revolution and now a National Historic Park.

Robert Allerton, of Kauai, Hawaii, an incorporator of the Pacific Tropical Garden and a member of the founding Board of Trustees, has contributed one million dollars to facilitate the work of establishing this new botanical garden by the Hawaiian Botanical Garden Foundation, Inc.

Search for White Marigold. Since 1955, when David Burpee first offered ten thousand dollars for a white marigold, more than thirty-seven hundred gardeners have submitted seeds. All these seeds have been sown and special bonuses paid for those which produced "almost white." One of the judges of the test plantings, Dr. Vernon T. Stoutemyer of the University of California at Los Angeles, has "been astonished by the progress made toward getting a pure white marigold." Dr. Stoutemyer is a guest investigator at The New York Botanical Garden and at Rockefeller Center, working with Dr. William J. Robbins, Director Emeritus of the Garden, on matters of mutual interest.

The treasure hunt continues and the ten-thousand dollar award still stands for a pure white form. The nearest-to-white so far developed is Burpee's 1965 introduction, 'Hopeful'.

Holly has become a standard nursery item since World War II, indicating that amateur gardeners recognize its beauty and adaptability. To promote even wider growing, it would be useful to find out where holly is being grown throughout this country and secondarily what species offer a reasonable prospect of successful culture in the various regions. Toward this end Dr. Robert B. Clark of the Bailey Hortorium, Ithaca, New York, searched through some of the nursery catalogues in the Bailey Hortorium collection.

Dr. Clark chose arbitrarily for sampling eighteen hollies: *Ilex aquifolium, I. cassine, I. cornuta, I. cornuta* 'Burfordii', *I. crenata, I. crenata convexa, I. crenata microphylla, I. decidua, I. glabra, I. latifolia, I. myrtifolia, I. opaca, I. pedunculosa, I. pernyi, I. pernyi* var. *veitchii, I. serrata, I. virticillata,* and *I. vomitoria.* These hollies represent a wide spectrum of adaptability, landscape use, popularity, and so forth. He did not include a dozen or more evergreen, red-berried species from eastern Asia, because too little is known about their cultural requirements to make a reliable assessment. Without doubt, however, there are plants among these species (*I. centrochinensis, I. chinensis, I. ciliospinosa, I. corallina, I. fargesii, I. georgei, I. integra, I. rotunda, I. rugosa, I. sugerokii,* and *I. yunnanensis*) which will extend the range of cultivated hollies both northward and into the midwestern states.

Ten states of the familiar forty-eight are without record of holly production—Arizona, Idaho, Montana, Nebraska, Nevada, New Mexico, North and South Dakota, Utah, and Wyoming. The greater the number of nurserymen listing a particular holly constitutes that state as a center of production of that holly. Thus four centers of holly production come into focus: (1) the South including Tennessee, (2) the Mid-Atlantic States including Cape Cod (Massachusetts), (3) the Great Lakes region (northeastern Ohio), and (4) the Far West (California and Oregon). Maryland produces all the kinds in the sample list.

The following indicates the number of states in which a particular holly is produced: *Ilex opaca* (32), *I. crenata f. convexa* (31), *I. verticillata* (31), *I. crenata* (27), *I. cornuta* (25), *I. glabra* (25), *I. cornuta* 'Burfordii' (23), *I. aquifolium* (20), *I. latifolia* (19), *I. crenata f. microphylla* (18), *I. vomitoria* (17), *I. pedunculosa* (15), *I. pernyi* (15), *I. cassine* (13), *I. decidua* (13), *I. serrata* (12), *I. pernyi* var. *veitchii* (11) and *I. myrtifolia* (10).

Dr. Clark, who is vice chairman of the Committee on Check List Revision of the Holly Society of America, gave this information on the history of holly culture in the United States as revealed by a study of nursery catalogs, in his report to the 1964 fall meeting of the Society held at Planting Fields, Oyster Bay, Long Island.

At the same meeting Paul Vossburg of Westbury, Long Island, made some interesting comments on companion plants of *Ilex opaca* in natural stands in the eastern coast states. He has found several distinct groupings. In the barrier beaches sumac, bayberry, beach plum, centaurea, and maritime goldenrod are companion plants; in back of the tidal marshlands, *Vaccinium corymbosum, Viburnum cassinoides* and *V. dentatum, Clethra alnifolia, Amelanchier,* and *Magnolia glauca* are to be found with the American holly. In another stand west of the Mississippi *I. opaca* is growing in an entirely different soil composition and with different companion plants.

Mr. Vossberg's observation indicates that *I. opaca* will grow in various soils from a high, dry, thin soil to a low, wet, heavy soil. The pH factor, he believes, is of less importance to its growth than has been considered, since he has found American holly in soils with a range from pH 4.8 to 7.

The Horticultural Society of New York, at its annual meeting on January 20, 1965, presented citations for distinguished service in horticulture:

to Highland Park, an institution, which was

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established in the 1890's "as a municipal activity in Rochester, New York, occupying one hundred acres of land with a large variety of aesthestic and cultural features. In 1962, after the addition of Durand Park's seven hundred acres in the Genesee Valley . . . it became a Monroe County rather than a city activity.

"In the early days Rochester was a principal center of the nursery industry which fact aided in the establishment at the Park of effective research programs, resulting in both technical and practical benefits. John Dunbar came to the Park from Scotland and his early efforts, particularly in the spectacularly beautiful lilac plantings and in the training of those who worked with him, set a pattern of excellence which has been maintained ever since.

"Wilbur E. Wright, the Director, and Bernard Harkness, taxonomist [who were present to receive the award] now have over twelve hundred acres to administer. In keeping with the times, their area involves recreational as well as horticultural aspects . . . Results of current research continue to impress contemporaries because of their practical significance." [Mr. Wright was an outstanding student gardener at The New York Botanical Garden, before going to Cornell University where he majored in landscape architecture.]

to John C. Wister, a professional, "who has long been an active leader of leaders in horticulture. His influence has been unique in its emphasis on the accurate, inclusive systems for plant groups which have brought order out of horticultural chaos. His uncommon breadth of experience and knowledge of the people and problems involved have made his leadership tremendously effective on professional, commercial, and amateur horticulture . . ."

to William Gotelli, an amateur, whose "energy, talent for surmounting import restrictions and difficulties in growing the material, his knowledge of administration, and his international contacts have resulted in the world's finest collection of dwarf evergreens.

"The importance of his achievement in the field of horticulture was magnified by his generous support and advice to institutions throughout the United States, Canada, and abroad, often in the form of propagating material for their own collections. His unique excellence was recognized by James Noble of Modesto, California, who left choice items of his own lifetime collection, a pygmy cedar and at least five other specimens found nowhere else in the world, to Mr. Gotelli in confidence that they would thereafter be appreciated and cared for well.

"The climax of this activity was Mr. Gotelli's presentation of his whole collection to the National Arboretum thereby benefiting the American public . . ."

The citations were presented by Sherman Ewing, Chairman of the Special Awards Committee. Serving on the Committee were Dr. Albert J. Irving, Mrs. Hermann G. Place, Mrs. Herman D. Ruhm, Jr., Dr. William C. Steere, and C. Powers Taylor.

BOOK REVIEWS

BIOLOGIST PHILOSOPHER. George, Wilma. 320 pages, references, indexed. Abelard-Schuman, Ltd., New York. 1964. $6.00.

The author of this biography is primarily trying to assess the significance of Wallace's scientific and other writing from the vantage point of present-day concepts. The minutiae which make up part of the traditional "definitive biography" are deliberately slighted. Wallace emerges as a self-taught biologist, a keen observer, and an original thinker. His experience in collecting vertebrate and invertebrate animals in the tropics of both the Old and the New World between 1847 and 1862 profoundly influenced his outlook and largely shaped his future career. An idea man who wearied of detail, he was glad to let other people work up a large part of his collections. He apparently felt no rivalry with Darwin, and he consistently used the term Darwinism for the theory of evolution by natural selection which he and Darwin independently developed. He was glad to see Darwin's elaborately detailed exposition of the theory, a much more thorough job than he would have been able to do himself.

A creative thinker who was more interested in coming up with the right answer than in proving it, Wallace tackled anything which interested him, from evolution to land reform, the origin of human speech, and the possibility of life on other planets. He could be gloriously right, or ignominiously wrong. He became completely convinced that a gifted medium could communicate with the spirits of the dead, and his espousal of spiritualism cost him much credence in the scientific community.

Aside from evolution, Wallace's most important work was in zoogeography, of which he must indeed be regarded as the founder. His gestural theory of the origin of language is still controversial, and its future status cannot be accurately predicted. His social thinking, with its stress on equality of opportunity, was more nearly in tune with our times than his own; but in spite of his lucid exposition, his voice never became a primary force in the transformation of our society.

One wonders how such a man as Wallace would fare today. Knowledge in all fields has accumulated to such startling proportions that the self-taught person is tremendously handicapped and probably has little or no chance to reach important new generalizations. Yet progress often depends on heresy, and the necessarily rigorous training of students in graduate schools tends to generate a scientific orthodoxy which is contemptuous of dissent. Would either Darwin or Wallace, if subjected to a training process comparable to that prescribed for graduate students today, have been able to come up with the theory of evolution by natural selection? Perhaps, but perhaps not.

ARTHUR CRONQUIST

THE RANGER'S GUIDE TO USEFUL PLANTS OF EASTERN WILDS. Deganawidah. 142 pages, indexed, sketches by Fred Oswald. Christopher Publishing House, Boston. 1964. $3.00.

This is a slightly revised edition of *The Beginner's Guide to Useful Plants of Eastern Wilds*, originally published in 1956. Deganawidah is the name given Fred Oswald by the Shinnecock Indians, who have made him an honorary member of their tribe in recognition of his capabilities as a naturalist. Excellent drawings of the plants considered and accurate botanical descriptions, which avoid involved technicalities not readily accessible to the layman, are accompanied by notes on synonymy, habitat and range, uses, and cautionary remarks. The presentation is chronological, with the added interest that plants are described not only at the point in the chronology when the useful portion is available, but as they appear through the course of seasonal changes. Careful cross references make locating each mention of the plant an easy matter. The volume is a model outline approach to the subject of readily utilizing food materials from our local flora.

HARVEY SIMMONDS

WILDFLOWER PORTRAITS. Thompson, Eloise Reid. 100 color plates, indexed. University of Oklahoma Press, Norman. 1964. $15.00.

This is not primarily a botanical book, but an effort to capture the beauty of living things. However, the paintings were made with attention to detail, and all the species represented were identified by botanists. Each is provided with botanical name and a brief note on distribution and outstanding features (scarcely a botanical description), with an explanation of the name (in these the present carping critic notes a few errors). One hundred species are shown, each on a full page; most of them are Texans.

The paintings are charming as well as true to life. The reproduction also is good (though I would venture a guess that they do not quite do the originals justice).

HAROLD W. RICKETT

WILD FLOWERS IN SOUTH CAROLINA. Batson, Wade T. 146 pages, illustrated (part color), indexed. University of South Carolina, Columbia. 1964. $5.00.

This is an attractive little book which fills a need for a state much neglected floristically. Some four or five hundred species are illustrated by color-photographs and provided with brief, rather technical descriptions. The photographs are mostly very good, but the reproduction is the average American hit-or-miss job. It is disturbing, for instance, to see *Smilacina racemosa* with bright yellow flowers. The text is marred by a number of mis-spellings which any good editor should have caught: *Tradescantia "obiocensis," Daucus "corota," "Circium" repandum, "Trillissa" paniculata.* In the list of authorities, Karl Heinrich Emil Koch turns up as "Kock," and George Arnott Walker Arnott as "Arnold." The index contributes a few more mis-spellings of botanical names. It is to be hoped that these defects will be removed from a future edition. In general, the book shows a considerable careful effort and should be useful to persons interested in the southeastern flora.

HAROLD W. RICKETT

MAN AND LAND IN THE UNITED STATES. Clawson, Marion. 178 pages, illustrated, indexed. University of Nebraska Press, Lincoln. 1964. $4.50.

Marion Clawson's long experience in government agencies concerned with land use, leading to his present position as Director of the Land Use and Management Program, Resources for the Future, has well prepared him for writing a book such as this. It is both an historical survey and a discussion of the theoretical and philosophical tenets which have shaped the relationship between the people of the United States and the land at their disposal. Having established the English attitudes toward property as the predominant Colonial American background, Mr. Clawson briefly traces the accumulation of land by the Federal Government and its reapportionment to the States and private landowners, with commentary on the methods by which this has been accomplished and the effects it has had on the Nation. The system of land surveys and verification of titles, the establishment of national preserves, and the present status of agricultural, urban, and forest lands in the United States are among the matters treated. The final chapter details what Mr. Clawson feels are the major problems to be met in order to assure intelligent use of the land and its resources in the future.

HARVEY SIMMONDS

GOD'S OWN JUNKYARD. The planned deterioration of America's landscape. Blake, Peter. 144 pages. Holt, Rinehart and Winston, New York, Chicago, San Francisco. 1964. Paper $2.95, cloth $4.50.

To review critically a book such as Peter Blake's *God's Own Junkyard* is not an easy task when one agrees largely with the theme presented. The title is an eye-catcher, although some might think it a bit facetious or even sacrilegious.

The points he makes, however, are well-documented, and the subtitle leads the reader directly to the subject. Our country is losing its natural beauty, and in such drastic fashion that some damage is already irreversible. In order, Mr. Blake discusses the "junkyard" in its various forms, the lords of the soil, the amenities of our society, the cities, the town-, land-, road-, car-, and skyscape, and closes with a hopeful plea for the future. One of his most forceful arguments is in his restraint from sermonizing through legends to the photographs which make up the greater part of the book; the readers' conscience is given the opportunity here to mark the contrast between the natural and the artificial, between (as in photos 133 and 134) the forest of trees and the forest of utility poles, between the rolling green hills and the bulldozed brown housing development. It is to be hoped that people will do more than just chuckle at the comparisons or cluck in pity, that they will take the problem to heart and do something about it.

Mr. Blake has done a great service to America by producing this book and the lessons therein. He stresses that much of what is needed cannot be legislated: it is an innate feeling which one has, or can acquire, for the natural beauty of our surroundings, be they animal, mineral, vegetal, or anthropoid. He states, "What manner of people are being reared in these infernal wastelands? . . . One answer is: people who no longer see." Today has been described elsewhere as a "here and now period," with emphasis on self-fulfillment and self-satisfaction. No one cares about the traditions or history of yesterday nor for the effect of today on tomorrow. Conservation not only of nature but also of material objects never enters the thoughts of many people, or else means nothing to them. At a symposium on Fire Island, W. S. Boardman said: "If he is subject to the laws of the Creator, then how can we prevent the consequences of this ruthless defiance (of laws of nature)? . . . I would ask, in the matter of respect for all forms of life, in the understanding of the basic laws of ecology, how can a sense of ultimate values be developed?" In my opinion, one reason for the present situation is that there are too many children growing up today who have never benefited from a stay with relatives or friends who lived on a farm; they have learned nothing of the world outside the city. This generation just isn't aware of the blight on the landscape and doesn't realize that it is an artificial, unnatural scene.

Mr. Blake takes several whacks at the bureaucrats whose proliferating (and frequently overlapping) agencies and multiplying regulations bring about many of the absurdities which are constructed in the cities, and penalize rather than praise the builder who shows a little creativity or ingenuity. Some of his statements bear quoting: "'. . . we have lost, or are about to lose, the most important asset of any successful city: variety.'" " . the one reason that compels us to do so many things: it's cheaper—and what's the difference, anyway?" "The frantic search for novelty (for the sake of novelty) is encouraged by all the pressures that surround us . . so that the successful writer, designer, musician, movie maker or artist is not the one who pursues quality, but the one who pursues and captures novelty."

The land also comes in for discussion by Mr. Blake. "The wholesale destruction . . is clearly not the inevitable result of the population explosion . . . It is the result of incompetence and ignorance . . it is also the result of pressures from those who speculate with land and who have a vested interest in making buildable land scarce . ." " . the American highway has become the prime symbol of a nation frantically running around in circles and, in so doing, scattering debris in all directions of the compass."

As one cause, Mr. Blake suggests a lack of political conscience in our communities. Some may dispute this thesis, but—of the eligible potential electorate, what percentage actually goes to the polls? And of these, how many understand the matters on which they must vote: zoning, housing laws, financing rules, and so on. He states, further, that ". . . the 'intellectual elite' in America has failed miserably to accept its basic responsibilities and to set an example of self-imposed restraint, an example of quality rather than novelty."

This book should be required reading for all legislators on every level of government, as well as for school children, women's clubs, sportsmen's groups, service organizations, and the like. If those who care are to do anything against the "planned deterioration" of our land, concerted action must be started immediately before further damage becomes irreversible. (It is encouraging to note, in this respect, that the New York Landmark Preservation Commission may at last get some status, and will be able to function more effectively.) Very few people concur on what is beautiful, what should be saved, but it seems to me that most should agree that the current trend is in the wrong direction. Let us hope that Peter Blake's example will be studied and heeded.

VIRGINIA A. WEADOCK

THE TROPICAL GARDENS OF BURLE MARX. Bardi, P. M. 192 pages, illustrated (part color). Reinhold Publishing Company, New York. 1964. $15.00.

A bold new voice can be heard in the world of landscape design. It is that of the richly talented Brazilian landscape architect Roberto Burle Marx. His is a new beginning as fresh and as stimulating as the great revolutions which have transformed structural architecture during the past forty years.

Landscaping is swept up in a new spirit less often than the sister art of architecture, so the Burle Marx revolution is an event of first magnitude.

For years English and Mediterranean gardens have been the patterns for most of those in the New World with, in recent years, an increasing

introduction of Japanese garden principles—a combination which has produced the interesting hybrid known as the "outdoor living" garden in California.

But Burle Marx offers a whole new synthesis as bold and colorful as his own vast, vibrant, exciting Brazil. It is a garden spirit for those who are satisfied only by large, sweeping strokes. It is perfectly fitted to tropical lavishness and to the revived interest in imaginative fantasy in contemporary architecture.

The photographs show both detail and overall landscapes; more than supplementing the text, they definitize it. Commenting on Burle Marx's basic approach, Professor Bardi writes that "it is logical for the garden to be molded with symmetry—that is to say, with an order corresponding to the irregular order of the flora. The geometrical garden destroys the idea of an imitation of nature. For Burle Marx, however, art should continue to imitate nature."

Burle Marx, he continues, "created the gorgeous, spreading garden, Brazilian style, that will go down in the history of landscaping as the successor of the English picture garden and opened up new vistas to this art that was born with the Garden of Eden."

The art of building, points out Professor Bardi, needs more than ever to be linked to the landscape. Lines of modern buildings demand this, but landscaping has failed usually to achieve it. However, a garden is not just a foil for the building it surrounds, in Burle Marx's view. Professor Bardi quotes him as believing that "a garden should arouse a sense of wonder, a fine diversity, and a feeling of euphoria through the arrangement of the masses and the color."

Burle Marx develops form as he finds it in nature. Inspiration for the undulating lines in which many of his beds of colorful foliage are arranged, comes from the sinuous lines of the Amazon and of Brazil's many rivers, according to Professor Bardi. (I am additionally struck by the relationship of these lines to some of the geometric patterns for which Rio's downtown sidewalks are famous and to some formal public garden patterns in Portugal.)

But Burle Marx gardens are not the drawing-board kind which all too often are created by men with knowledge of design but not of its plant content. Burle Marx knows his plant material both as the content of design and as living, changing organisms. "A garden might be considered in the light of the changing substance of things fated to age and disappear as they live out their existence in a natural parabola." (At this point a single criticism—translation into English in this trilingual book is often very wooden. And with some plant names translation is misleading—for example, *Plumeria* to red jasmine rather than frangipani.)

Burle Marx was born to a German father and Brazilian mother in São Paulo in 1909. The family moved to Rio de Janeiro in 1913. In 1928, while studying art in Germany, he was a frequent visitor to the Dahlen Botanical Garden. He designed his first garden in 1933, though as a youth he had created gardens at his parent's homes in Pernambuco and Copacabana. Outstanding among the public gardens he has designed, in addition to many private gardens, are the Parque del Este in Caracas and the Beir a Mar on Rio's waterfront.

PHIL CLARK

MEN WITH GREEN PENS: LIVES OF THE GREAT WRITERS ON PLANTS IN EARLY TIMES. Bush-Brown, Louise. 161 pages, illustrated, bibliography. Dorrance & Company, Philadelphia. 1964. $5.00.

Louise Bush-Brown is perhaps best known as co-author with her husband of *America's Garden Book*. *Men With Green Pens* is an account of nine of the early herbalists, from Theophrastus in the fourth century B.C., to John Gerard in the late sixteenth century, with a prefatory note on the Papyrus Ebers. It does not supersede the works of E. L. Greene, T. A. Sprague, Agnes Arber, and Eleanour Sinclair Rohde, nor is it intended to. Notable are the absence of an index, the very brief bibliography, and the varied emphasis on botanical, historical, bibliographical, and biographical matter in the several studies. It is disappointing that in the six essays which include sizeable excerpts from particular herbals, Mrs. Bush-Brown has not provided modern synonymy to allow ready identification of the plants described. The book is pleasantly written and succeeds in giving a general biographical picture of a number of the herbalists, together with some sense of the development of the herbal.

HARVEY SIMMONDS

BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS. DeBach, Paul, E. I. Schlinger and others. 844 pages, illustrated, indexed. Reinhold Publishing Company, New York. 1964. $22.50.

Drs. Paul DeBach and E. I. Schlinger, assisted by fourteen other entomologists and professors of biological control from the University of California (Berkeley and Riverside) have compiled a monumental work on an interesting and most worthwhile subject. That subject is the control of insect pests and weeds by predator and entomophagous insects, fungi and disease.

Each author is a specialist in his field and has gained world-wide recognition because of it. In truth, according to the information printed on the dust jacket flap, the authors' combined years of intensive research and study of how best to handle, import, and breed the natural enemies of local insect and plant pests, covers a total span of two hundred.

It is not known when man first became aware that certain insects live at the expense of other insects. No doubt, it was quite early in his existence that an observant *Homo sapiens* noted the worth of predator insects in his primitive agricultural economy. The ancient Chinese, it is said, early recognized this and employed a certain species of ant to rid their citrus groves of foliage-feeding insects. The Chinese even set up bamboo poles as "ant bridges" between trees, the more quickly to enable the ants to find and consume their prey.

But while predaceous insects were known at a comparatively early date, it was long before insect parasitism was recognized. It was later, still, before its value to agriculture was even partially understood.

Along with insect predators and parasites, even in the Middle Ages, the presence of disease among insects, such as honeybees and silkworms, was known. However, it was only in recent years that insect pathology (and microbial control) was added to man's arsenal in his war against specific insect pests.

Biological Control of Insect Pests and Weeds reads well. Each of the sixteen entomologist-contributors have taken up different phases of the science. The book is so well edited that the serious student, or casual reader, were it not for the individual by-lines, would scarcely be aware that he was reading the work of different specialists-authors.

In the light of the awakened interest in the subject of biological pest control, this volume fills a gaping niche in the science of entomology.

RALPH J. DONAHUE
Shawnee Mission, Kansas

MICROSCOPE AND THE WORLD OF SCIENCE. Riemer, Marvin F. 334 pages, illustrated, indexed. Herman Publishing Service, Stamford, Conn. 1964. $3.95.

This book is evidence that its author is a competent microscopist and photomicrographer and an accomplished teacher. The publisher does not reveal the identity of the author, but it may be noted that he is a teacher of science at Evander Childs High School, Bronx, New York. The book is written in clear and simple language directed to the enthusiastic, inexperienced amateur microscopist in search of a dependable guide. The microscope and its use are clearly explained and directions are given for a number of projects and experiments requiring a microscope. There is an excellent chapter on photomicrography.

The book was inexpensively printed in Japan, and though the line drawings are adequately reproduced, the reproduction of the illustrative photographs is poor.

ALMA W. BARKSDALE

MAPPING. Greenhood, David. 289 pages, indexed, illustrated. Phoenix Science Series, The University of Chicago Press, Chicago, Illinois. 1964. (Paper.) $2.95.

Mapping is crammed full of information for the beginning map-maker and a fine introduction to the lore of maps in general. The author's colorful style makes for very pleasant reading and the illustrations are excellent. This is a revised and expanded edition of the volume which was published in 1944 under the title *Down to Earth: Mapping for Everybody*.

CHARLES C. CLARE, JR.

BRIEF NOTES ON RECENT BOOKS

BONSAI

BONSAI: TREES AND SHRUBS. Perry, Lynn R. 234 pages, illustrated, indexed. Ronald Press, New York. 1964. $7.50.

Miss Perry's book is a "Guide to the Methods of Kyuzo Murata," under whom she studied the techniques of bonsai at the Kyukaen Bonsai Gardens in Tokyo. Mr. Murata has grown many fine bonsai, some of which are to be seen at the Brooklyn Botanic Garden.

Part I is a clear exposition of "Bonsai: Trees and Shrubs," and Part II furnishes "Instructions and Schedules for Individual Species."

Miss Perry taught bonsai at the Brooklyn Botanic Garden. Now as proprietor of the Suzuen Bonsai Company in Erie, Pennsylvania, she lectures, demonstrates, and teaches the art of bonsai throughout this country.

FLOWER ARRANGEMENT

JAPANESE FREE STYLE—FLOWER ARRANGEMENT. Quinn, Lee Early. 116 pages, illustrated, indexed. D. Van Nostrand Company, Inc., Princeton, N. J. 1964. $5.95

While her husband was stationed in Japan, Mrs. Lee took the opportunity to study seriously Japanese flower arrangement, spending four years of training in the Ikenobo and Ichiyo Schools.

The aim of her book, according to Mrs. Quinn, is to "present the 'what, why, and how' of Japanese free style, the freshest and most powerful influence in contemporary flower arrangement."

The book is well illustrated, with fifty-two black and white photographs of Mrs. Quinn's own arrangements and twenty-three schematic drawings of underlying design concepts.

FLORAL ART FOR AMERICA. Lowry, Martha Ryan. 191 pages, illustrated (part color), glossary. M. Barrows and Company, New York. 1964. $17.50.

This is a beautiful pictorial presentation of the art of arranging flowers, fruits, gourds, and vegetables for the home, for exhibitions, and for special occasions. Nineteen full-page color plates, eighty-one black and white plates, each accompanied by a listing of the plant material, the container, the height and width of the arrangement, the mechanics, and a brief description of the style or period of the arrangement.

Mrs. Lowry, one of the first accredited judges in Pennsylvania, has lectured before symposiums in New York, Baltimore, Philadelphia, Chicago, Williamsburg, and several universities; and she has exhibited at many flower shows and at the Carnegie Museum.

The superb photographs are the work of Harold Corsini, whose assignments have taken him to Arabia, Africa, China, the South Pacific, and elsewhere.

MISCELLANY

ESPALIERS AND VINES FOR THE HOME GARDENER. Perkins, Harold O. 206 pages, illustrated, appendix, indexed. D. Van Nostrand Co., Princeton, N. J. 1964. $6.50.

The home gardener can turn to this book to solve his problem of what ornamentals to grow and how to grow them in limited space. Espaliered trees, including fruit trees, and shrubs are attractive in formal and informal gardens.

Basic patterns for espaliered plants and how to start and train such plants are adequately covered in the first part of the book; and this information is followed by other helpful chapters, including "Fifty Fine Ornamentals to Espaliers," "Fruit Trees as Espaliers," "Seventy Excellent Vines," and "The Right Vine for the Right Place."

PLANTS IN HIS PACK. Beaty, Janice J. 182 pages, illustrated, bibliography. Pantheon Books, Random House, New York. 1964. $3.75.

This book, one of the series of Pantheon Portraits for the Young Reader, relates the story of Edward Palmer, a scientific collector of plants, animals, birds, and Indian artifacts from the frontiers of western America and Mexico. In pursuit of scientific knowledge, Palmer lived the rugged and adventurous life of the American pioneer.

Dr. Rogers McVaugh, of the University of Michigan, author of *Edward Palmer, Plant Explorer of the American West* (Oklahoma Press, 1956) prepared the bibliography for Mrs. Beaty's book.

POISONOUS PLANTS OF THE UNITED STATES AND CANADA. Kingsbury, John M. 626 pages, illustrated, indexed. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1964. $13.00.

A comprehensive reference tool and textbook designed for physicians, veterinarians, and research workers who are concerned with the practical problems posed by poisonous plants, and for non-specialists who want to investigate these plants. The author is Associate Professor of Botany at the New York State College of Agriculture and Lecturer in Poisonous Plants at the New York State Veterinary College, Cornell University.

The book begins with a review of the knowledge of poisonous plants in Europe and the United States, then goes on to a detailed description of the poisonous principles in plants. The main part of the volume consists of descriptions of individual poisonous plants listed alphabetically by scientific name under botanical families which are arranged taxonomically. It includes the toxic members of all groups of plants, except bacteria, which are known to have poisoned livestock or human beings in the United States and Canada. The discussion of each major plant, following the entry under its scientific name, includes the common name or names of the plants, a description of it, distribution and habitat, poisonous principle, toxicity, and the symptoms and conditions of poisoning. Excellent line drawings illustrating many of the commoner species are supplemented by photographs made by the author. The bibliography contains 1715 references.

This well-organized, readable, and authoritative book is a contribution of major importance to the literature of poisonous plants.

QUANTITATIVE PLANT ECOLOGY, 2nd ed. Greig-Smith, P. 256 pages, indexed. Butterworths, Washington, D. C. 1964. $8.95.

This revised edition of a book by the Reader in Botany in University College of North Wales incorporates new material covering the considerable advances in methodology which have become established since the first edition appeared in 1957. Some chapters have been largely rewritten and substantial additions and revisions have been made throughout the volume. As formerly, the book provides a broad survey of the quantitative approach to plant ecology and a thorough exposition and critical assessment of the more widely used techniques involved in the application of statistical methods to phytosociology. This new edition of an outstanding and widely recognized work by the leading British authority on the subject will be welcomed by all plant ecologists.

LITERATURE OF BOTANY, GUIDE TO THE. Jackson, Benjamin Daydon. 626 pages, indexed. Hafner Publishing Company, Inc. New York, N. Y. 1964. $12.50.

This is a facsimile of the 1881 edition, a "classified selection of botanical works, including nearly six thousand titles not given in Pretzel's 'Thesaurus'." Reprinted under license from The Linneau Society of London, it will be welcomed by libraries, both public and private, and botanical institutions—as a new acquisition by those who do not possess the original and as a replacement by those whose copy is probably no longer in good condition, since the 1881 edition was printed on poor paper.

PROTOZOA IN BIOLOGICAL RESEARCH. Calkins, Gary N. and Francis M. Summers (eds.). 1,148 pages, illustrated, indexed. Hafner Publishing Company, New York, N. Y. 1964. $17.50.

A reprint of the book which was originally published in 1941 by Columbia University Press. Resulting from the collaboration of a group of specialists gathered together at the Marine Biological Laboratories at Woods Hole, Massachusetts, it was intended as a stimulus to further research on unicellular plants and not as a textbook.

PLANT BREEDING

GENETICAL PRINCIPLES AND PLANT BREEDING. Williams, Watkin. 504 pages, illustrated, indexed, bibliography. F. A. Davis Company, Philadelphia. 1964. $12.75.

A comprehensive survey of present knowledge concerning the genetical principles which govern the lives of flowering plants. The author, who is Professor of Plant Science in the University of Newcastle upon Tyne, emphasizes throughout the volume those aspects of genetics which are applicable to the breeding and improvement of crops. The book presupposes a good basic acquaintance with genetics on the part of the reader. It can be thoroughly recommended to advanced students and specialist research workers in the field of plant breeding. An extensive and up-to-date bibliography is included.

FLORA

A GUIDE TO MEXICAN FLORA. Clark, Phil. Editorial Minutiae Mexicana, Mexico. 96 pages, illustrated, (part color). 1964. $1.25.

Briefly described are some of the most conspicuous native and introduced ornamentals—trees, shrubs, vines, cacti and succulents, orchids, bromeliads, herbaceous perennials and annuals. A visitor to this fascinating country will enjoy his trip all the more if he carries this attractive handbook on Mexican plant life with him.

Included are lists of gardens which are open to visitors, a glossary of the English, Spanish and scientific names of plants most frequently seen in Mexico, and a section about the garden in modern Mexico and its relation to family life.

This little book may help to awaken North Americans to the rich flora of the Republic to the south.

FLOWERS

ALL ABOUT GERANIUMS. Schulz, Peggie. 175 pages, illustrated (part color), indexed. Doubleday & Co., Inc., New York, N. Y. 1965. $4.95.

A fine addition to the All About . . . Series, this one offering practical advice on growing geraniums (pelargoniums) indoors and outdoors,

propagating and hybridizing them, training them into tree—and other forms, exhibiting them at shows, on protecting them against pests and diseases. Chapters are devoted to the various types, fancy-leaved, scented-leaved, trailing and climbing, miniatures, and others.

GERANIUMS AND PELARGONIUMS. Fogg, H. G. Witham. 156 pages, illustrated, indexed. Charles T. Branford Co., Newton Centre, Mass. 1964. $4.50.

Those who are seeking information on these plants will have no trouble in obtaining it. For here is another good book, covering culture in greenhouse and garden, propagation, selection of types and varieties, displaying them at shows and around the home. Pests and diseases are also included. There's one point to be borne in mind—this is an English book and there are some points of deviation because of climatic differences. Many of the species or varieties mentioned are obtainable in this country; Mr. Fogg gives American as well as English sources for geraniums and pelargoniums.

FORTY FAVORITE FLOWERS Nichols, Beverley. 87 pages, illustrated. St. Martins Press, Inc., New York, N. Y. 1965. $4.95.

Each of these flowers is given a descriptive subtitle by Mr. Nichols—for example, *Clematis tangutica* or "Silver Threads among the Gold," *Catananche caerulea major* or "Not Quite Immortal," *Primula denticulata* or "The Rewards of Wickedness." The last refers to his having "ripped a seed-pod from a public garden," yet being rewarded by the lusty vigor and free-flowering plants, "quite unaware of their disreputable origin."

Mr. Nichols notes not only reveal his flights of fancy, but give some practical insight into the likes and dislikes of his forty favorites. Each flower is accompanied by a full-page black and white photograph.

FERNS

FERNS OF THE SOUTHEASTERN STATES. Small, John Kundel. 517 pages, illustrated, indexed. Hafner Publishing Co., New York. 1965. $10.00.

This valuable work, describing and illustrating one hundred and eighty-nine ferns and fern allies "growing naturally in the states south of the Virginia-Kentucky State Line, and east of the Mississippi" has been out of print for a number of years. This facsimile of the edition published in 1938 will fill a long-felt want.

GARDENS

GARDENS AROUND THE WORLD. Schuler, Elisabeth. 256 pages, illustrated (color). Harry N. Abrams, Inc., New York, N. Y. 1964. $17.50

Two hundred and forty color plates vividly portraying gardens, beds, and borders, patios, ponds and pools from eastern United States to Japan, also Greece, Turkey, Germany, Holland, France, England, and close-ups of the leading flowers of these countries. Some of the colored illustrations are excellent, in some the colors of the flowers have a "muddy" cast or the sky is an unreal blue; in others the color seems bleached out, probably because the photographs were taken in the middle of the day when light is intense.

There are charming black and white sketches, and an interesting section on roof gardens.

HOW TO PLAN, ESTABLISH AND MAINTAIN ROCK GARDENS. Schenk, George. 112 pages, illustrated, index of common names of plants. Lane Book Co., Menlo Park, Cal. 1964. Paper $1.95.

The elements of rock gardening, the kinds of rock gardens—for landscape effect, scree, desert, Japanese-inspired — rock gardening in pots, frames, and alpine houses all are well treated by Mr. Schenk. A landscape designer professionally, he has traveled widely in this country and abroad, studying plants in their native habitats, collecting them and growing them in his Seattle garden.

The last forty pages or thereabouts are devoted to an alphabetical listing of plants suitable for rock gardens—a brief description and cultural directions being given for each plant.

Please note that Book Service can accept orders only for books priced at more than one dollar because of publishers' regulations and requirements.

A flower of *Magnolia campellii.*

The late Eric Walther, who was Director of the Strybing Arboretum for many years.

LETTERS TO THE EDITOR

Although it is now over ten years since my visit to The New York Botanical Garden, that day still continues to be a joy, and each copy of *The Garden Journal* brings it back.

After reading the September-October, 1964, issue, I thought you might like to hear of an experience I had at the Strybing Arboretum in February, 1957. I had gone there to see the famous *Magnolia campbellii,* for that is the season it is supposed to be at its best. It was raining—and how it rains in San Francisco—but between showers I was able to get around. A park man seemed to be following me at times; no doubt he thought I was crazy, lugging camera equipment under a big rain cape. Then it dawned on me who he might be. I asked him, and it was Eric Walthers.

When I told him I had come to see *M. campbellii,* he told me all about it: that in 1924 the [Golden Gate] Park had imported a two-year-old plant from England which first bloomed in this country in 1940; that he had sent to India for seeds in the 1930's; and that many of the seedlings, now large trees, were identical to the species but had different blooming periods, coming weeks after it has finished flowering. This factor is very useful in San Francisco where February conditions may mar the quality of bloom. Mr. Walther also pointed out a tall, white-flowering tree from the same seed and said they were considering naming it *Magnolia* 'Strybing'.

What made this visit memorable for me was that he told me he had been presented, at a dinner the night before, with a gold medal bearing a magnolia. He took the medal out of his pocket to show it to me.

I am told that the two pictures I took of Mr. Walther on that day may be among the few of him in existence, for he was seldom photographed. He let me put my camera on the tripod and take a delayed action shot—and there I was with all my rain gear and the Exakta.

HELEN D. CARSWELL
Sepulveda, Cal.

Botanic Gardens
Cluny Road
Singapore 10
14 December, 1964

Corpus Scientificus ejusque Praefectus Horti Botanici Singapurensis hoc festivo tempore vobes salutem dicent et annum venturum properum desiderant.

H. M. BURKILL, Director

Correction. The caption on page 231 of the November-December, 1964, issue of *The Garden Journal,* illustrating the article on "Paleobotanical Exploits in Colorado and Kansas" by Herman F. Becker, should read: Lower left. A large fossil leaf of the Sanmiguelia "palm," *Sanmiguelia lewisi,* removed from the sandstone matrix. This fragment (11" × 6") of a twenty-two-inch leaf (estimated) is now on view in the paleobotanical exhibits of The New York Botanical Garden. Center. Polished section of a fossil palm stem (Palmoxylon) showing cross-sections of roots and conductive tissue. Lower right. A coal ball "peel" of *Lepidostrobus pulvinatus,* the cone of a *Lepidodendron,* from the coal-ball area of southern Kansas.

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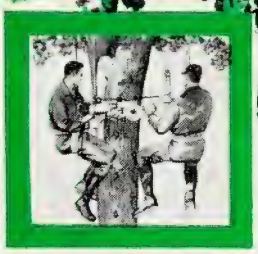

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THE GARDEN JOURNAL

THE NEW YORK BOTANICAL GARDEN

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THE GARDEN JOURNAL

DOROTHY EBEL HANSELL, *Editor*

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WILD FLOWERS EN MASSE

By MARJORIE G. SCHMIDT

Mrs. (Willard E.) Schmidt of Hayfork, California, an avid gardener for most of her adult life, has been especially interested in growing native plants for the past fifteen years. She was formerly a member of several garden clubs, but has forsaken them to devote more of her time to the serious study of native plants. Mrs. Schmidt is a member of the California Horticultural Society, the California Academy of Sciences, and the Garden Writers' Asscoiation of America.

A FIELD FILLED TO THE BRIM with multicolored wild flowers never fails to touch me deeply. It rouses nostalgia for childhood picnics or, perhaps, a vividly remembered field trip with friends who shared my appreciation of nature's lavish displays. Wild flowers en masse is a phenomenon which does not occur frequently in our modern world, but was at one time a characteristic feature of the wild landscape in California. John Muir wrote that the great Central Valley was once an unbroken flowery plain, a delight to see, and to walk through. Today most of these areas contain fast-growing cities which, along with agricultural crops, take the place of poppies, lupines, and buttercups. Only in remote regions can aggregations of wild flowers still be found. In such relatively untouched places each season brings its characteristic plants, from the white meadow-foam rippling beside a spring run-off to the last resinous-scented tarweed in the autumn.

Although many California wild plants occur in unlimited quantities, I shall consider those which generally grow in fields and open places. In small upland valleys, little meadows tucked between the folds of the foothills, rolling slopes, flat mesas, and open grassy regions provide areas in which wild flowers are apt to bloom with characteristic abandon. These are generally modest annual plants, but by their multitudes they color acres, even miles of the California countryside. Sometimes the flower colors are delicate and exquisite, while in other places they may be bold, even dazzling. These annuals generally start up with the first warmth of spring, come quickly into flower, set their seed, then disappear with scarcely a trace. Most typical fields include a few perennials, along with certain bulbous plants which nature has given in conspicuous numbers.

The advent of spring which brings the field flowers is made known with little warning, even to those who watch with eager anticipation. Suddenly, among the misty green of emerging grasses, the fields become yellow, pink, lavender, blue, a grand mixture of colors. This long parade usually begins in February with the yellow pansy *(Viola pedunculata).* On sunny slopes, even in chilly winds, baby-blue-eyes *(Nemophila menziesii)* spreads patches of intense azure. The California-poppy *(Eschscholzia californica)* blooms by February or earlier, the first flowers a rich copper-orange. Dense rivulets of white meadow-foam *(Limnanthes douglasii)* zigzag along moist depressions. These are soon joined by waxy, yellow buttercups *(Ranunculus californicus)* and species of *Lupinus* and *Gilia.* Thus another spring season is on its way.

Certain combinations of native field flowers are typical, occurring in open areas over much of the state. California's golden poppy is perhaps the best known of all field flowers; it is a short-lived perennial with a long, carrot-like root. Formerly its vast quantities spread a compelling glow over the landscape. A variety of well-known annuals accompany the poppy in classic combinations. These include small blue lupines (*Lupinus nanus, L. bicolor,* etc.), bird's-eye gilia *(Gilia tricolor),* brassy yellow goldfields *(Baeria spp.),* white popcorn flower *(Plagiobothrys nothofulvus),* and buttercups. Each region has its typical combinations repeated with local variations.

Where water is present in mountain valleys, color displays continue through April. One such area has lush masses of wild flowers flowing in rainbow colors along the water courses. Typical here are the deep blue larkspur *(Delphinium variegatum),* crimson tomcat clover *(Trifolium tridentatum),* tidy-tips *(Layia platyglossa),* cream-cups *(Playstemon californicus),* rosy owl's-clover *(Orthocarpus purpurascens),* and bright yellow Johnny-tuck *(Orthocarpus erianthus),* along with poppies, buttercups, and popcorn flowers. A member of the Parsley or Carrot Family may grow here, but is also present on the higher slopes; this is *Lomatium utriculatum* which has flat umbels of tiny, bright yellow flowers. It sometimes grows with yellow pansies and buttercups for a monochromatic scheme. Particular favorites of mine are the small cream-cups, each plant resembling a miniature Iceland poppy, with pendent flower buds which open to stamen-filled, ivory-white flowers. Baby-blue-eyes is also a prime favorite, a beloved plant of my childhood. Its exquisite color verges on turquoise, an opinion expressed by Reginald Farrer when he compares it to a newly discovered gentian. (*Rainbow Bridge,* page 283.)

Although field flowers most frequently occur in mixtures, a single species may dominate the area. Thick stands of owl's-clover, with dense, rosy purple flower spikes, are apt to overpower other blooms. Such a field existed at the edge of a reservoir where high water kept it wet until midspring. As the water receded and the ground warmed, the owl's-clover came quickly into flower, its velvety carpet dominating scattered clumps of brodiaeas and popcorn flower. In the upper Sacramento Valley, in fields not yet under cultivation, pretty tidy-tips grow in almost solid concentration. These large, pale yellow daisies with white-tipped petals are often accompanied by *Brodiaea congesta,* lupines, or cream-cups. To travelers in this region, the March fields appear as a vast yellow carpet spreading from one mountain base to another. Frequently the California-poppy grows alone, or at times is joined by fiddleneck *(Amsinkia douglasiana),* whose coiled spikes of bright orange add to the blaze of color.

Many species of *Lupinus* are prevalent on western landscapes, and far too often accepted without comment. *Lupinus bicolor* may cover entire slopes in coastal areas with its ultramarine-blue flowers. The tiny, white flower-balls of the popcorn plant may overtop the lupines, giving a charming airy effect. In another field the deep blue flowers, match-

Meadow-foam, *Limnanthes douglasii*, thrives in moist depressions.

ing those of the lupine, of *Gilia achillaefolia* combine with cream-cups, owl's-clover, and poppies to present a delightful spectrum of bloom. Where the silky blue-purple flowers of grass-iris *(Sisyrinchium bellum)* are present, a deeper color tone pervades the area. Although it is not the true Texas bluebonnet, *Lupinus succulentus* is often called bluebonnet. It has tall, dense spikes of blue-purple flowers and forms meandering colonies in open areas. On a much greater scale the extensive drifts of pagoda lupine *(Lupinus densiflora)* sweep through open fields and up warm slopes. This annual lupine is common to many sections of California. Although the flowers are usually white, they may hold tints of lilac, blue, or deep rose.

Out in the great Central Valley typical plant combinations prevail during the spring. Perhaps more than elsewhere these displays have been reduced by land development which yearly takes its sad toll. Here, another meadow-foam *(Limnanthes rosea)* has white flowers veined with rose, giving a pinkish cast which deepens as the flowers age. Again, goldfields and Johnny-tuck form extensive patches of yellow along river bottoms in the wake of receding waters. In another few weeks, a myriad of small, annual mimulus will change the color scheme. This might be *Mimulus tricolor,* whose pert, tubular flowers of rose-purple flare open to show markings of crimson and yellow. On slightly higher ground, where the gigantic valley oaks grow, patches of baby-blue-eyes and cream-cups appear. Bordering the warming foothills rise the dense spikes of cream-sacs *(Orthocarpus lithospermoides).* Tansy phacelia *(Phacelia tanacetifolia),* with coiled spikes of lavender-blue flowers, imparts a hazy blue mist to the landscape. The valley phacelia *(Phacelia ciliata)* was once abundant in both large and small valleys and, like the tansy phacelia, cast a bluish haze by its numbers. Only small patches appear now, in old orchards or along roadsides. I once found it making a surprising but determined stand among rows of onions in a commercial vegetable garden.

A most remarkable feature of some fields is the abundance of species of *Brodiaea* of the Lily Family. Some are merely sprinkled through the fields, but add rich blue, purple, or violet tones, pale yellows, even pure whites. The well-distributed *B. capitata* carries blue-purple flower-heads over a long period in spring. Especially in rolling foothills *B. pulchella* replaces it, with tightly clustered, crimson-purple flower-heads. The white brodiaea *(B. hyacinthina)* is well distributed in moist fields and meadows, even invading orchards which are not constantly cultivated. It has been my good fortune to see several other species blooming with generous splendor near the rising foothills of the Central Valley. *Brodiaea coronaria* has open clusters of violet-purple bells, blanketing many acres with its vivid color. *Brodiaea minor* often grows with it, its deep lavender flowers on short stalks forming patches of a paler color range. Less common, yet abundant where it does occur, is the golden brodiaea *(B. ixioides).* Its delightful small clusters of bright yellow stars cast a shimmering glow in grassy fields. *Brodiaea laxa* is perhaps my favorite, a beautiful species with agapanthus-like umbels of clear violet-blue bells. Where it mingles with other flowers, the fields and slopes become magnificent, garden-like landscapes.

In a seemingly whimsical mood, nature often makes color combinations which the gardener would not dare attempt. This is most apt to occur on exposed slopes, in shallow soil where the colors of flowers become intensified. The brassy goldfields, whose solid flower-disk completely hides its short stems, may be most abundant. Bird's-eye gilia becomes deep blue-violet, poppies verge onto tangerine, and owl's-clover

California-poppies, *Eschscholzia californica,* and *Lomatium utriculatum* fill a field with their bright yellow flowers.

Blazing-star, *Mentzelia lindleyi.*

forms dwarfed, dense spikes of rich magenta. When portulaca-like red maids (*Calandrina caulescens* var. *menziesii*) joins this company, a vivid color scheme results. In some areas scattered clumps of the red-purple onion *(Allium serratum)* may appear in this dashing melange, or a colony of blazing star *(Mentzelia lindleyi)*. Its flashy golden-yellow flowers hold a vermillion spot at the center; with their numerous stamens, they resemble a hypericum. Such compelling and distinctive mosiac carpets enhance many arid slopes.

These burgeoning, colorful fields begin to dry out and grow dim by late April, although some annuals may linger on and perennials continue to flower. Flat, white sprays of the common yarrow *(Achillea millefolium* var. *lanulosa)* remain in flower as long as there is any moisture. Most larkspurs flower late, and even in little groups enrich many foothill areas by their vivid colors. Small patches of *Delphinium decorum* mingle with other plants of open slopes, its luminous, bright blue flowers making up for the lack of numbers. The checkerbloom *(Sidalcea malvaeflora)* continues to punctuate fields with their rose-pink floral spikes.

Plains and mesas of southern California are frequently sheeted by one or more of the free-flowering and brilliantly colored phacelias. *Phacelia minor,* known as California bluebell, is one of these; its rich purple bells also make an effective garden plant. *Phacelia parryi* and *P. viscida* spread deep blue and purple blankets from the coast inland up into the desert hills. Where one of these is accompanied by the golden-poppy, orange and purple carpets extend for many miles. Native to similiar places, and also to canyon flats of the Coast Range foothills, is thistle sage *(Salvia carduacea)*. This is a striking plant; the clear violet-blue flowers, which protrude from a woolly calyx, are borne in whorls above thistle foliage. In favored regions the thistle sage mingles with the bright yellow daisies of *Coreopsis douglasii,* lupines, tidy-tips, and fiddleneck for vividly colored landscapes.

May brings quantities of several *Linanthus* species, small plants with sparse foliage and heads of phloxlike flowers. Where concentrated, they appear as pink drifts flowing in the high shade of oaks, or on northern or eastern slopes. Especially dear to me is *Linanthus androsaceus* with its nicely formed heads of pink, salverform flowers sparked with a tiny spot of black at the heart of each petal. It is a dainty plant, hardly to be classed with the usually vigorous field type. However, by its great numbers *L. androsaceus* can effectively color many gently contoured hills and upland valleys. A somewhat larger species is *L. grandiflorus,* whose satiny pink flowers cast a shimmer over warming fields. The term California phlox is most often applied to this species, which is gradually becoming a popular garden subject. Very precious is the fringed pink *(Linanthus dianthiflorus),* a six-inch annual with pink or rose, delicately fringed flower-petals; it was once common in coastal valleys and canyons of southern California. I know it only as a garden plant and admire its diminutive, yet free-flowering qualities. Evening snow *(Linanthus dichotomus)* is equally fascinating, but seldom occurs in abundance. Many times, hurrying home from a field trip in late afternoon, I have seen the white drifts of its flowers which open on the twilight hours and close again the following morning. Foot-high plants bear terminal clusters of the white flowers, having a brownish tinge on the reverse. Sometimes my notes are rapturous—I once described the flowers as white disks, appearing to float down a rocky incline!

The appearance of godetias and clarkias among grasses already beginning to dry marks the close of the spring show. Although most species occur in quantities, only a few have the vivid colors which give an exciting impact to the fading landscape. Generally godetias are robust plants, a foot or more tall, with satiny flowers, lavender, pale to bright pink, rose, or crimson. In most species the petals are marked by contrasting spots, stripes, or bands of deeper color. *Godetia viminea* is plentiful, and although small, its vivid rose-crimson flowers make glowing patches on dry slopes among coyote brush and poison-oak. *Godetia amoena,* common in foothills, produces many light crimson flowers, with a luminous crimson spot in the heart of each blossom. Godetias and clarkias were among the first western annuals to be improved by English horticulturists. To the naturalist these selected forms are in no way superior to the wild ones, except that a wider color range has been achieved. The clarkias, closely related to godetias and growing in similiar situations, flower in May and June. They bear modest flowers when compared to the cup-shaped godetia blooms. Plants are slender, generally unbranched, with slash-petaled flowers in shades of pink. *Clarkia elegans,* the most widely distributed, has dusty pink flowers brightened by crimson stamens. *Gilia capitata* frequently accompanies it, with its powder-blue flower-heads in lively contrast to those of the clarkia.

By late June moisture is gone from the soil, and fields and slopes turn brown with drying grasses. Only a few tough, drought-tolerant plants and weeds occur in noticeable quantities. Tarweeds, members of several genera of the extensive Composite Family, fill the fields. These generally

have subdued flower colors, although some, such as *Madia elegans,* may have bright yellow daisies. The sticky foliage has a pungent, resinous scent characteristic of the summer countryside. Another highly scented plant occurring in quantities is vinegar weed *(Trichostema lanceolatum).* A member of the Mint Family, this low plant bears deep blue flowers, almost lost on leafy stems. It is remarkable that the flowers of this malodorous plant are an important source of delicately flavored honey.

The California countryside today is radically different from that which greeted the early explorers. As they slowly disappear with the passing years, our native plants should become more precious. This can be accomplished by setting aside typical areas, especially near fast-expanding cities, to preserve the few remaining flower fields. Some writers admonish the hand-wringers to work toward saving what remains rather than to bemoan that which is gone. However, I cannot resist a wistful backward glance for the beautiful vanishing flower fields that were once so glorious a feature of my native California.

Triphora trianthophora.

DOWN IN THE VALLEY AND UP ON THE MOUNTAIN

By GEORGE A. ELBERT

Mr. and Mrs. Elbert are enthusiastic botanists and visit interesting places in search of native plants which they photograph, and about which they write and lecture. They gave an illustrated talk, "How to Find Wild Orchids," as one of the Winter-Spring, 1965, Saturday Afternoon Programs at The New York Botanical Garden.

LAST YEAR in the beginning of August we drove south on a photographic vacation over the Skyline Drive and the Blue Ridge. The summer home of Florida friends on a lake near Tuxedo, North Carolina, some twenty-five miles south of Asheville, was our first objective. Without any definite itinerary we planned to explore the surrounding areas of the Big Smokies, the lower Blue Ridge and the Piedmont. The morning after our arrival we headed for Pearson's Falls Glen.

This famous preserve is off Route 176 between Saluda and Tryon, only a few miles to the southeast of where we were staying. Driving slowly we spotted the marker on the right side of the highway and turned into the dirt road which dips into the valley and wanders between cliffs beside a brook for about a mile. Then another sign led us the few hundred feet to the gate house. The caretaker came out, accepted the small fee, and directed us to the parking lot. In response to our inquiry, she said that most of the best flowers were gone but that someone had told her there were small brown orchids by the picnic shelter.

The Glen has been visited and admired by botanists since before the turn of the century. It is the haunt of two of the most beautiful and rare trilliums, *T. hugeri* and *T. gleasoni* (better known as *T. cuneatum* and *T. declinatum*). When the property came up for sale in 1931, the Tryon Garden Club succeeded in the considerable achievement of purchasing the 308-acre tract. Donald Culross Peattie wrote a booklet about it, to which Dr. Oliver W. Freeman contributed a listing of the flora. He made a collection of pressings taken from the Glen, which is now housed in a little building next to the gatehouse.

In August the finest flowering of the forest is past—the turn has come of open, sunny areas. The Glen is a steep, dark, and humid place down which the brook rushes over boulders. The sky that morning was clear at the start; but by the time we arrived, it was threatening rain and it was gloomy, to say the least. Our trip seemed to have given the weather a signal to turn nasty, and for several days the countryside was subjected to a continuous drench. At least we got through our main work that day before the storm broke.

We had hardly passed the picnic shelter when we spotted a number of stems of the crane-fly orchid, *Tipularia discolor.* A moment later we saw the much rarer little nodding-pogonia, *Triphora trianthophora.* It was one of those moments—for we had been looking for this species a long time. Fernald says that it usually develops "only at remote periods." Against the damp brown leaves the crane-fly orchid was hardly visible, being leafless itself, and the *Triphora,* in spite of its whiteness, is so lowly and small that one easily passes it by. During the morning any number of picnickers arrived and wandered about, but we do not believe that one of them noticed these plants. If they did, they probably took them for "weeds."

Tipularia discolor grows up to twenty inches high. The thin, naked stem bears whorls of small flowers at the top. They are an indeterminate brown in color, the petals and sepals arranged radially and the lip an insignificant dull white. It looks like an attenuated *Epidendrum. Triphora trianthophora* is about ten inches high, at most, with a few leaves and a stem of the texture of a small watercress. At the tip the stem seems to develop into a tube which is about a half inch long and very narrow. The color of these specimens was dull white; looking inside the tube, we saw only a sort of greenish yellow roughness. The petals flared only very little at the mouth of the flower. Though these are among the less showy orchids, they possess some of the fascination of this greatest of families. Very careful observation always

Saxifraga michauxii

Chelone lyoni.

reveals beautiful or curious detail.

We worked our way gradually up the Glen to the falls, which were not very full, and then climbed by a little-used trail up one of the hillsides. There we found both orchids in abundance and eventually located a few which were sufficiently in the clear to be photographed by natural light.

The appearance of the area was such as we have come to recognize as highly favorable to moisture- and humus-loving plants. Dr. Edgar T. Wherry made some of his very useful soil tests here, finding its range to be from slightly acid to perfectly neutral. These are rare conditions, and the experienced botanist can almost draw from his knowledge a list of the plants which can be expected to grow in them.

When the first drops of rain began to fall, we scrambled back to the car. On the way out we stopped to purchase the booklet of which I have spoken and were surprised to note the absence of *Triphora* from the botanical list. Certainly it must turn up here quite regularly. We have a healthy scepticism of the word "rare" when applied to plants. Invariably, it seems, when we have identified a plant for the first time and learned to recognize it, we soon find others. Our experience in this instance was typical.

We sloshed along the road back to the highway and stopped at a restaurant near Tryon for lunch. Afterwards we headed north with the general idea of reaching Brevard. On the way we bought a basket of the local green grapes which are the best eating in the world. The skin has a tang which quite counteracts the usual insipidity. Once started on, however, they are harder to give up than peanuts. The weather was foul, and our trek proved longer than expected. So instead of going all the way, we turned off on Route 276 and headed toward the Blue Ridge Parkway.

Shortly after we had passed the big picnic grounds, and before the road started to climb, I saw an area on the left side which had the same general appearance as the Glen. We stopped and I went into the woods to investigate. Hardly fifty feet from the road, I came upon solid beds of *Triphora.* These were much prettier than the others, being a deep pink and about half the size of the Pearson's Falls plants. A lucky break in the weather allowed us to take some pictures with a minimum of light.

I am certain that if we had been able to look for other places in the valleys, where the under growth showed evidence of the presence of rich humus, we should have found a number of other stations.

The following morning found us working our way north on the Blue Ridge Parkway, destination the top of Mt. Mitchell which at 6,684 feet is the highest point in eastern North America. From the Ashville entrance the road climbs steadily to fifty-five hundred feet and Craggy Gardens, renowned for its display of rhododendrons earlier in the season. There it levels off for a stretch. A few miles farther on, a side road leads to the grave of the botanist Dr. Elisha Mitchell at the summit.

It was an exciting and frustrating day. It rained; it blew; cloud banks descended on us and vanished. The sun would appear for ten minutes and then the rain would come again. Driving around tight curves, we smashed into solid walls of cloud; we moved slowly along, hoping that oncoming cars would be equally cautious. I find this kind of driving fun, but such weather allows little scope for exploration and photography.

The best we could do was to park on the turf and wander about small patches of woods or rock which seemed to promise something of special interest. This proved at least one thing—that there is plenty to keep a body busy in such places even without going far afield. The sides of the road were lined with a bewildering profusion of flowering plants.

Our shrub and tree knowledge is small, but we could not ignore the splendid show they made. Outstanding at lower levels was the sourwood tree *(Oxydendrum arboreum)* from whose splayed whitish racemes bees make the best honey in America, and whose foliage at high altitudes was already blotched with scarlet. Then there were gorgeous pink- and red-flowered shrubs for a few miles which we took, probably erroneously, for a species of *Viburnum (V. cassinoides?),* certainly as handsome as any garden shrubs of the type. Occasionally there would be a magnificent sugarloaf of a mountain-ash, its mound of orange berries massed in a pinwheel of green leaves.

In our wandering on the Blue Ridge the next most extraordinary thing to the wonderful masses of bloom, which make it seem at times like a drive through a carefully collected and cultivated garden of native wild flowers, is the perfect indifference of families. They go whizzing along the parkway, stopping only occasionally for untakable snapshots of the view or to eat. To be sure there is a certain exhilaration in just driving, even in such tame mountain landscapes as this. But that our generation of parents takes so little interest in the composition of the living world through which it passes makes one aware of the mass inertia against which the champions of our natural heritage are struggling. Without very great additional efforts, their children will be even more ignorant and incurious.

An advantage of botanizing in the Blue Ridge is the possibility of finding plants blooming in one period which is equivalent to two weeks to a month and a half on the coastal plain. The road varies from a few hundred feet above sea level to well over five thousand feet, with corresponding changes in temperature and rainfall. Worthy of note is the division of plants into the two categories of those whose blooming time is affected by the altitude and those which flower without any effect of altitude.

Undoubtedly the showiest flowers were the yellow composites. In our own area there is not much variation in the height and structure of these plants, which often give a depressing effect of dryness. Along the highway they ranged from a foot to more than ten feet in height, the flowers standing out against a rich mass of foliage. The great sunflowers displayed many forms of leaf and many different plant outlines. *Polymnia uvedale* formed elephantine mounds. There were quantities also of the other composites, for instance, the white *Cacalia atriplicifolia* and its more impressive relative *C. muhlenbergii* which, with its big leaves, was quite monumental. *Liatris graminifolia* purpled banks which on other days would be sunny and dry.

This was the first time that we had seen quantities of *Campanula americana.* Compared with the cultivated varieties, the flowers lack substance and the blue is rather watery. But the growth is handsome—like that of delphiniums. Would not this be an excellent plant for the hybridizers to work on? With a little improvement it would be a superb garden perennial. Of a much richer hue, but unfortunately rather weak in the stem, are the aconites, *Aconitum reclinatum* and *A. uncinatum.* The cobalt-blue is incomparable, and we also came across a warm gray-blue which was the loveliest shade we have seen. The flower is a study—one sepal with two small petals inside to make the "monkshood," and such a vigorous furry circle of stamens below the hood. Elsewhere we have seen a white form.

Where a little moss had grown in a damp spot in a ditch, we saw a whole colony of the little club-rein orchid, *Habenaria clavellata,* in a straw-colored and sturdier version than our northern kinds. Another miniature, forming mats, was *Houstonia purpurea,* a southern cousin of our true-blue bluets. Among rocks the sprays of *Heuchera americana* foamed over the most oranamental of maple-shaped leaves. *Saxifraga michauxii* was still going strong above fifty-five hundred feet, a mist of white bloom with darting variegated red and green foliage. Seen individually, they are marvels of symetrical form.

One of the most surprising plants was found by chance, while we were photographing one of the torchlike mints of the region. It was a still happily flowering *Clematis glaucophylla.* This odd vine has a bloom, if one can properly call it that, which is about two inches in the round, and sepals which are so fleshy and shiny red that it reminds one of a tiny apple artistically carved into the appearance of a pendent flower.

The most impressive sight of the day was the appearance of balsams *(Abies fraseri)* above the fifty-five-hundred-foot mark. From this level to the top they formed a solid forest, with trunks like masts and shortish branches fringed with black-green needles. They were tufted all over with growths of an epiphytic moss and in the driving clouds reminded us exactly of certain Japanese prints. There was little under growth in this region of boulders and moss. But where soil could gain a foothold solid masses of the turtlehead, *Chelone lyoni,* formed a rich pink carpet beneath the trees. This is a stockier, heavier-flowered species than the others.

Up at the top the view was obscured and the wind was uncomfortably strong. But, unexpectedly to say the least, we came upon extensive brambles of wild raspberries loaded with large and richly flavored fruit. Gathering these, we enjoyed refreshment in its most pleasurable form. Alas, the pictures wouldn't be much, but we had had quite a day.

In May, when sea-winds pierced our solitudes,
I found the fresh rhodora in the woods,
Spreading its leafless blooms in a damp nook
To please the desert and the sluggish brook:
The purple petals, fallen in the pool,
Made the black water with their beauty gay,
Here might the red-bird come his plumes to cool,
And court the flower that cheapens his array.

Rhodora! if the sages ask thee why
This charm is wasted on the earth and sky,
Tell them, dear, that if eyes were made for seeing,
Then beauty is its own excuse for being.
Why thou were there, O rival of the rose!
I never thought to ask; I never knew,
But, in my simple ignorance, suppose
The selfsame Power that brought me there, brought you.

RALPH WALDO EMERSON

TREES AND SHRUBS, DECIDUOUS AND EVERGREEN, FOR TODAY'S LANDSCAPE

By DALTON W. BATTIN

Mr. Battin is Supervising Landscape Architect of the Cincinnati, Ohio, Board of Park Commissioners.

IS THERE ANY BASIC DIFFERENCE in plant material for today's landscape? Plant material, except for newly introduced clones and cultivars, has not changed greatly, but its uses have as adapted to current needs. There is really nothing miraculous or magic about the words modern and contemporary. Skeptics and prophets, conservatives and radicals have existed in every age. We may not want to wear the label of either extreme, but progress necessitates our taking a stand somewhere.

Landscape architects, nurserymen, horticulturists, and arborists must keep informed on changing requirements for plant material. Let us, therefore, direct a calm but calculating eye at ornamental plants, first for the purpose of considering their general classification as to scale and growth habits; then let us take a second look for the purpose of selecting plants for specific uses. Obviously my recommendations are governed by the particular locale and climatic conditions with which I am familiar and colored by personal preference and prejudice.

THE IMPORTANCE OF SCALE

Of the many mistakes made in planting design and in the selection of plants for landscaping, perhaps the most glaring and needless are those in which optimum growth is overlooked. So often "the cute little plant" in the nursery row becomes a space-filling giant. How important, then, to think of the woody ornamentals in terms of their utimate growth-habits. There are plants which may be considered one size smaller than their ultimate size because of extremely slow growth. For example, the beech, though large in ultimate size, may be considered a medium-sized tree since it takes more than a lifetime to attain its ultimate height. Such exceptions may be appropriate for residential properties. However for public areas in which planting is being done truly for posterity, I prefer to consider actual ultimate growth.

On narrow sidewalks, paving blocks allow rain to penetrate to tree roots without interfering with walking space. A "pioneer planting" of *Eucommia ulmoides* was spaced at standard parking intervals to avoid conflict with car doors.

It is mainly this matter of related size that places trees and shrubs into ten basic classifications. Large, medium, and small trees account for the first three; large, medium, and small shrubs for the second three. Evergreens divide into large and medium-small, with broad-leaved evergreens put into a separate list because of climatic restrictions. Ground-cover plants make up the tenth list. Brevity necessitates an arbitrary limitation of ten plants to each basic list; alternate or supplemental plants will, of course, be substituted depending on local conditions and personal preference.

I acknowledge that performance factors, as well as scale and ultimate growth, also govern the placement of plants on basic lists. There are generalities which can be said about each of these lists, which may prove helpful. We are more cautious than formerly about the optimum size of tree plantings. We are admonished to use large trees with discretion, particularly as street trees. Certainly the unsightliness from necessary utility-line trimming is lesson enough in this respect. The small tree, particularly the flowering tree, assumes a special importance; one reason is its relative scale, the other the bonus of its floral display.

As I think about the shrub groups, I find that a fault in the past has been the misuse of the larger shrubs. Now we use them discriminately, perhaps as specimens to grace a large wall. We covet the small shrubs, realizing that they are too few in number. We need them to reduce maintenance of hedges and to work into places where large and medium shrubs have been unwisely planted in the past.

We have the same need for small-sized evergreens, yet we are faced with a similar shortage of plants from which to choose. A part of this demand for lower-growing plants results from changes in contemporary architecture, but much of it, in my opinion, comes from an awareness of mistakes which have contributed to overgrown plantings.

We should constantly be on the alert to avoid the monotony of narrow-leaved evergreens in foundation plantings. It is here that broad-leaved evergreens are especially valuable. Since there are so few broad-leaved plants which are reasonably hardy in northern zones, we should not ignore the acid-soil plants even though this may mean special culture. Andromeda *(Pieris japonica),* mountain-laurel *(Kalmia latifolia),* and certain rhododendrons can be used in climates where *Mahonia* and *Ilex crenata* and its varieties

Street trees grow better if there is protective curbing from winter salt damage. Underplanting aids scale, as shown here at the seventy-five-year-old City Hall in Cincinnati.

are too tender. Interesting twig formation in deciduous plants, especially in the smaller sizes, can be another answer to the problem of introducing variety to evergreen plantings where broad-leaved kinds are limited.

While we are on the subject of scale relationship, let us not forget the value of ground-cover plants in today's landscaping. Sometimes these plants are merely substitutes for grass in areas where grass is difficult to grow. This is a natural argument for the use of ground-cover plants, but not the only one. Though grass is still the best cover where conditions permit, ground-cover plants serve well as an intermediate step between grass and small shrubs. The contrast of an upright specimen against a setting of ground-cover material often dramatizes the specimen as a piece of natural sculpture more effectively than grass or small shrubs.

Environmental and Maintenance Factors

Special use categories can be valuable in studying vandalism, low maintenance, and other problems of urban planting design. A selection of smoke-resistant plants is just as helpful in an urban situation as a selection of plants resistant to salt-air and wind might be in another (specific) environment. There is need for a study on vandal-resistant plantings. In places of serious vandalism, we should omit the more fragile in favor of durable subjects. Sometimes, however, the choice of plants is not as important as the way in which they are used. A hedge set tight against a wall is safer in an urban area than a hedge in the open, and a fence next to or within the hedge is another protective device to discourage damage. A specimen tree can be enclosed in a small barrier fence for a hardening-off period or until the tree is large enough to withstand the physical brunt of children at play.

On the very important subject of maintenance, not only the selection of plants, but the way in which they are used is pertinent. Size and optimum growth come up again for consideration, emphasizing how important they are. Hedges, for example, could be used more frequently if slow-growing or small-scale plants were more readily available which would reduce the necessity of trimming to only once or twice a year. It is conceivable that with the proper material, hedges could be had which would require almost no trimming to achieve the desired effect.

Another important maintenance consideration when selecting plants is that of spraying requirements. Knowledge of the susceptibility of certain plants to insects and diseases may suggest their omission from basic lists. For more than twenty-five years, the Cincinnati Park Board has avoided planting the American elm, magnificent though it is. The removal, row after row, of these trees from parkways because of *Phloem necrosis* in the middle 1930's was reason enough for this drastic policy. We are presently avoiding heavy plantings of the moraine locust because of the mimosa webworm, and of the horse-chestnut because of the leaf-blotch disease and the environmental leaf-scorch problem.

Street trees or other tree plantings in paved areas is a subject in itself, but may be discussed briefly here as a maintenance factor. Where the sidewalk is narrow, spacing may dictate the use of paving blocks laid dry around the tree to permit adequate walking space while allowing for the penetration of rainfall. We have now and then found it more practical to enclose the trees in a raised curb to prevent the penetration of accumulated winter salt into the planting. Low plantings behind such curbs add interest to the tree picture and relieve the barren appearance of paved areas.

Portable boxes and tree boxes are a solution on a temporary basis or as a compromise for no planting. Sometimes

Tree boxes cause cultural problems but are an effective compromise where underground utilities make ground plantings impractical. These boxes in downtown Cincinnati, holding *Malus zumi calocarpa*, were designed by Cincinnati Parks Engineer John Scollan.

street trees planted at ground level are impractical because of the complexity of underground utilities; then trees in boxes are better than no trees at all. Maintenance costs are higher for trees in boxes. However, such trees can be grown to a healthy, well-established state before being moved into urban settings, making survival more certain and occasional casualties less obvious. A surprising virtue of trees in boxes is that they are less subject to careless damage by the public, probably because they are grown at a higher level above the walk. It has been our experience in short-term trials that heavy ground-cover plants, such as euonymus 'Emerald Cushion', are more vandal-resistant in tree boxes than small ones, such as English ivy or myrtle which are easily "lifted."

In addition to scale and optimum growth and maintenance and other special points, there is also the purely aesthetic factor to be considered when selecting trees and shrubs. We must be familiar with and recognize the differences in texture and in color. Here we become involved with planting design and can mention only briefly that certain parts of a landscape composition must have dominance. Contrast in shape, structure, texture, and color are means of expressing such dominance. We must remember, too, that when there is too little contrast the effect is one of monotony; when contrast is too great or repeated too often, the result is confusion.

BASIC LIST of PLANT MATERIAL (based on relative scale and growth).

LARGE TREES
- red oak *(Quercus borealis)*
- pin oak *(Q. palustris)*
- white oak *(Q. alba)*
- sugar maple *(Acer saccharum)*
- red maple *(A. rubrum)*
- sweet-gum *(Liquidambar styraciflua)*
- tulip-tree *(Liriodendron tulipifera)*
- willow oak *(Quercus phellos)*
- bald-cypress *(Taxodium distichum)*
- ginkgo *(G. biloba)*

MEDIUM TREES
- tupelo or sour-gum *(Tupelo sylvatica)*
- littleleaf linden *(Tilia cordata)*
- yellow-wood *(Cladratis lutea)*
- Japanese pagoda-tree *(Sophora japonica)*
- river birch *(Betula nigra)*
- goldenrain-tree *(Koelreuteria paniculata)*
- hornbeam *(Carpinus)*
- Kentucky coffee-tree *(Gymnocladus dioicus)*
- hedge maple *(Acer campestris)*
- beech *(Fagus)*

SMALL and FLOWERING TREES
- Arnold crab-apple *(Malus floribunda arnoldiana)*
- carmine crab-apple *(M. astrosanguinea)*
- dogwood *(Cornus florida)*
- redbud *(Cercis canadensis)*
- Washington hawthorn *(Crataegus phaenopyrum)*
- saucer magnolia *(M. soulangiana)*
- Kwanzan cherry *(Prunus serrulata lannesiana)*
- Siebold viburnum *(V. sieboldii)*
- sweet bay magnolia *(M. virginiana)*
- white fringe-tree *(Chionanthus virginica)*

LARGE SHRUBS
- *Viburnum burkwoodi*
- *Viburnum tomentosum*
- *Viburnum rufidulum*
- other viburnums
- forsythia 'Spring Glory'
- lilac hybrids
- *Magnolia stellata*
- *Cornus mas*
- witch-hazel *(Hamamelis mollis)*
- Russian-olive *(Elaeagnus angustifolia)*

(Continued on page 133)

Among the old varieties of crab-apples, "Carmine' still performs well in comparison with the new ones.

AIR POLLUTANTS AND THEIR EFFECTS ON VEGETATION

By Robert H. Daines, Eileen Brennan, and Ida Leone

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Much has been written and spoken about such process and fuel originating gases as sulfur dioxide and fluorides. The phytotoxic properties of these gases have been thoroughly established. However, the information available concerning the effects of chlorine on vegetation is still extremely limited.

Twenty years ago (1944) the extreme phytotoxicity of fluorides had not been discovered. It was then, because of injury in two areas along the Delaware River, that we of the Rutgers College of Agriculture were asked by the farmers concerned to inspect the damaged vegetation, determine the cause of the injury, and make recommendations for its abatement. On inspecting the areas we observed that the same plant species were exhibiting injury symptoms in each area and, furthermore, the symptoms appeared to be the same for each area. We also observed that a large number of plant species were responding—cultivated and native species growing in uncultivated areas. The cultivated species included fruit and ornamental trees and shrubs, flowers, and many vegetables as well. Such a broad spectrum of species response was surely not suggestive of plant disease or insect pests. The occurrence of this injury in uncultivated areas argued effectively against fertilizer injury or faulty horticultural practices being responsible; the farmers had decided that the problem was one of air pollution and suits had been filed at the time of our first visit. This approach was discouraged, and a supported research project to study the problem encouraged. A modest appropriation was made by the State Legislation and the air-pollution project (the first of its kind) was initiated at Rutgers University.

A study near the centers of injury revealed etched glass to be present in both affected areas. In addition, a study of literature disclosed injury symptoms to corn and peaches from cryolite (a fluorine-containing insecticide) which appeared to be very similar to those observed along the Delaware. Controlled fumigation using fluorides, together with chemical analysis of plant parts, later confirmed the early finds. Fumigation experiments have demonstrated the extreme toxicity of HF (hydrogen fluoride) to plants, injuring leaves of gladiolus and field corn at extreme dilutions. Chinese apricots also have been found to be among the most sensitive of plants. The injury symptoms normally consist of marginal necrosis, such areas being a buff color on most plants.

A great variation in susceptibility exists among plant species, some exhibiting markings, perhaps severe, while others in the same immediate vicinity appear to be unaffected. And injury to young leaves, without the old leaves showing similar response, has been frequently observed.

Sulfur dioxide also commonly visually injures some species of plants, while other plants in the same exposure escape injury. Sulfur-dioxide injury appears similar to that caused by fluorides; however, there is a tendency for injury caused by SO_2 to be intercostal in some plants. Alfalfa, quite sensitive to SO_2, has been used in many controlled experiments. In this region injury is most often observed on tulips, apple, violets, and some conifers.

Limited studies with Cl (chlorine) suggest that it is intermediate in toxicity between HF or SO_2, requiring about 0.1 ppm to injure the more sensitive plants. The common weed, mustard, appears to be one of these.

During the last few years, a new group of pollutants has been of major concern. The products responsible for these pollutants have their origin in all fires. Relatively little is known about the chemistry of their genesis and the phytotoxicity of these gases, ozone, peroxyacylnitrate (PAN) and its analogues, and the bisulfite addition-products (perhaps aldehydes) generated in the sunlight from relatively nontoxic stack and exhaust-pipe gases. Currently these are receiving much research and public attention in a number of our urbanized areas. They are best known as the ingredients of the Los Angeles smog. These photochemical reaction-products occasionally occur in concentrations sufficient to injure certain species of plants in many of the urban areas of the world. Perhaps, therefore, a brief consideration of their origin and effects on plants would be of value.

Ozone

Ozone, a highly reactive gas, occurs in trace amounts in the atmosphere over all areas of the earth; these trace amounts are not known to be harmful to life. During electrical storms, however, ozone may be generated in localized areas in concentrations sufficient to damage the more sensitive plant species. In recent years ozone injury has occasionally occurred over wide areas, involving several counties at once. When such episodes occur, it is not uncommon to find several species of plants affected.

Ozone has been known for many years to be toxic to vegetation, but not until Richards and Middleton (1958) described a stipple to the upper surface of grape leaves in California vineyards as being attributable to ozone was there evidence of ozone toxicity occurring in nature. The next year Heggestad of the United States Department of Agriculture and Middleton described a light-colored flecking of the upper surface of tobacco leaves in the eastern part of the United States as due to ozone toxicity. This type of injury, called "weather fleck," has been observed over an extensive area extending from the Carolinas to Toronto, Canada; and before the substitution of a more resistant variety, it was charged with reducing annually the value of the Connecticut cigar-wrapper tobacco by over one million dollars. Early in 1960 we (Daines, Leone, and Brennan) published a bulletin reporting ozone as a cause of damage to over a dozen plant species in New Jersey. This took ozone out of

the class of minor importance and placed it in the category of a major air pollutant affecting agriculture. Since these three reports were published, the list of plants occasionally injured in nature by this pollutant has been lengthened considerably to include forest trees, ornamentals, vegetables, fruit crops, and certain weeds.

Ozone-toxicity symptoms appear as flecks, stipple, streaks, and spots. Flecks, first observed on tobacco, have since been observed on all and reproduced on many of the following plants: swiss chard, spinach, cucumber, turnip, mustard, carrot, radish, onion, parsley, watermelon, squash, tomato, cantaloupe, sunflower, sweet pea, escarolle, chicory, endive, and chickweed. A dark stipple, first observed on grapes, also occurs on beans and white potatoes. In the field, cereal crops have frequently exhibited necrotic spots and streaks which can be attributed to ozone; these streaks appear in the well-aerated tissue between the veins. In addition, a number of plants typically developing milk-white spots of varying size as a result of ozone toxicity include spinach, alfalfa, clover, radish, turnip, tomato, and cucumber. Tip burn to white pine needles has been shown to be ozone-induced.

Ozone-produced leaf spots are frequently visible only on the upper surface, because the palisade cells (next to the upper epidermis) are the first to be injured. The leaves of a number of plants do not have palisade cells; hence injury to such leaves is usually about the same on both the upper and the lower surface.

Peroxyacylnitrate (PAN) has been identified, isolated, and used in fumigation experiments in which injury symptoms occurring in nature have been reproduced (Stevens and co-workers). PAN and its analogues are highly phytotoxic, producing symptoms similar to those observed in the Los Angeles area for the past twenty years. Called "silver leaf" and "leaf banding," they seriously affect many plant species, not only in California but throughout the Northeast and other urbanized areas. The loosely packed, spongy parenchyma cells are readily attacked just above the lower leaf epidermis, but under more severe conditions palisade cells are destroyed as well. The oxidant produces a glazing of the lower epidermis which may exhibit a sunken appearance, perhaps because of the collapse of cells adjoining the epidermis, or it may produce extensive necrotic areas on both leaf surfaces. These areas may vary from milk-white in spinach to gray in cultivated dandelion and chicory, and to a brownish upper-leaf coloration in burraccia.

Some white varieties of petunia are especially sensitive, and greenhouse-grown chrysanthemums may exhibit this type of injury. Other plants showing injury from PAN here in the East are swiss chard, table beets, romaine and iceburg lettuce, spinach, curley endive, white potatoes, and tomatoes. PAN and its analogues are believed to destroy several million dollars worth of agricultural crops annually in the United States; and reduced plant growth and increased cost for hand labor in sorting damaged leaves from the produce in preparation for market are considerable.

Bisulfite Reaction-Products

In January, 1964, we reported that injury to the leaves of petunia 'Snowstorm' occurred in New Jersey whenever bisulfite addition-products (including aldehydes) reached a toxic concentration in the ambient air. In New Brunswick, New Jersey, during the late summer and fall months, this type of injury occurred on an average of once every ten days. The symptoms were unlike those caused by ozone, appearing similar to those caused by PAN. However, since the oxidant concentration of the ambient air was low at these times, it was unlikely that ozone and PAN (both oxidants) were the responsible phytotoxicants. The plant species known to be affected by the bisulfite addition-products are limited to certain white petunias and perhaps Bel W tobacco. Further work may add to the list.

Sources of Pollutants

Ozone. Oxygen and nitrogen are non-reactive at normal temperatures. However, when exposed to the elevated temperatures in furnaces and automobile cylinders, nitrogen oxide (NO) is formed from the combination of these two gases. This oxide is vented with other wastes into the free air where, in the presence of the shorter light rays (2900 to about 3700 angstrom units) and organic gases, NO_2 results. Under the influence of these light rays, nitrogen dioxide releases an atom of oxygen which may unite with molecular oxygen forming ozone.

$N_2 + O_2 + \text{heat} \longrightarrow NO$

$NO + O_2 + \text{hydrocarbons} + \text{UV light} = NO_2$

$NO_2 + O_2 + UV \longrightarrow NO + O_3$

Ozone is also believed to be formed from reactions occurring in the atmosphere which involve hydrocarbons and their oxidized products.

Organic Phytotoxicants. In California, back in the early 1950's, Haagen Smit demonstrated that hydrocarbon fumes do not possess a very high order of phytotoxicity, nor do these fumes when mixed with NO_2 in the dark show an altered toxicity to plants. However, when hydrocarbon vapors are mixed with NO_2 in the presence of sunlight, or with ozone, they become highly phytotoxic, producing the "silver leaf" and necrotic patterns observed in nature.

It has been suggested that about five per cent of the hydrocarbons entering the automobile cylinder passes through unburned and is expelled in the exhaust. The percentage, of course, varies with the engine conditions, the operating cycle, and the fuel composition.

Because of the heat in the cylinder, some cracking of hydrocarbons actually occurs, with olefins and aromatics being produced. The olefin-content of exhaust gases may actually be higher than that originally present in the gasoline. Hydrocarbons having five or less carbons are high in concentration, and the amount of oxidized hydrocarbons found in car exhaust is relatively low. While all the hydrocarbons expelled into the atmosphere are eventually oxidized on exposure to the ultraviolet light of the sun, the olefins are perhaps the first to respond. These are broken at the double bonds, producing decomposition compounds rich in aldehydes. Further reactions result in the formation of many other compounds, including PAN.

Little is known about the organic effluents from chimneys and stacks. But an unconfined flame without a wall-quench zone might be expected to achieve more complete combustion than would occur in auto cylinders, and because the temperatures are lower in furnace fires operating at standard pressures than in cylinders, the NO_2 contribution in the ef-

(Continued on page 114)

PLANTING FIELDS ARBORETUM

By GORDON E. JONES

Dr. Jones is Director of the Planting Fields Arboretum.

GARDEN PATHS BECOME a floral fairyland at Planting Fields Arboretum in May, when rhododendrons, azaleas, and other flowering shrubs, and Japanese cherries, flowering crab-apples, and dogwoods burst into bloom. It is delightful to walk along them, or through the wooded slopes which are highlighted by hundreds of azaleas, the lovely native Carolina rhododendron, and many other rhododendrons. But there are other attractions which bring visitors to Planting Fields Arboretum in Oyster Bay on the north shore of Long Island, not only in May and June, but in other seasons of the year, for this is one of the notable horticultural show places of the Northeast.

During the summer the shaded paths and expansive lawns are attractive to visitors; in September and October they enjoy the brilliant colors of the many fine trees and shrubs; in winter they walk through the greenhouses which are filled with anthuriums, hibiscus, orchids, camellias, and other subtropical and tropical plants. The camellia collection numbers about one hundred and fifty cultivars of *C. japonica* and *C. reticulata*. The largest plants, which were purchased by Mr. Coe in 1916 from John Waterer, Sons, and Crisp Nurseries, Bagshot, England, are handsome when they are in flower from late December through April.

The greenhouses are open to the public Monday through Friday, except holidays, from 8:30 a.m. until 4 p.m. The Arboretum is open daily from 8 a.m. until twilight. There is no admission fee.

Planting Fields was originally the estate of the late William Robertson Coe, who over fifty years ago began collecting plants from many parts of the world. His collection of rhododendrons and azaleas, numbering some six hundred species and varieties, is considered to be one of the finest in the East. His earliest purchase of rhododendrons, a large shipment of *R. catawbiense* hybrids, was from Anthony Waterer Nursery in 1916. Many of these hardy plants are now very large and present quite a sight when in flower. Mr. Coe's interest in rhododendrons continued throughout his life, and he obtained many of the new hybrids and also some of the species.

Interested also in trees, Mr. Coe saw to it that they were planted with ample space for their full size at maturity. Thus majestic European and copper beeches, silver lindens, Lebanon and Atlas cedars, Sargent weeping hemlocks, and many other superb trees grace the spacious lawns. William R. Coe, Jr., tells of the steps his father took to bring trees he especially wanted to Planting Fields. One such tree was a copper beech on the estate of H. H. Rogers, his father-in-law, in Fairhaven, Massachusetts. The tree had a height of

Stately American elms and floriferous rhododendrons adorn the courtyard and pool of Coe Hall at Planting Fields Arboretum.

One of the many beautiful azalea walks at its peak of bloom in mid-May, with dogwood and early-flowering rhododendron hybrids.

Weeping silver linden, *Tilia petiolaris*, is handsome in its fall foliage on the lawn just north of Coe Hall. A towering elm stands at the right.

Sections A, B, and C of the Synoptic Garden in October display an excellent range of fall colors.

The Arboretum's Information Shelter is located at the entrance to the Synoptic Garden.

A boxwood-lined path leads to the sunken pool garden, with tea house at the far end. Rhododendrons flower here in May.

thirty feet, a trunk diameter of two feet, and a platformed ball of soil twelve feet wide. The tree was transported across Long Island Sound by barge, then moved over two miles of road to Planting Fields. The operation took three weeks, seventy-two horses, and a steam roller pulling the load. This magnificent copper beech stands just north of Coe Hall, the former manor house.

Coe Hall, a spacious structure of seventy-five rooms, considered to be one of the finest examples of Elizabethan architecture in this country, was designed by Walker and Gillette, a New York architectural firm. Its stone, brick, lead, and stained glass details and its hand carving in wood are most interesting. The building was completed in 1921; it now accommodates the offices of the Arboretum and conference rooms.

Another noteworthy architectural feature is the Carshalton Gates at the formal entrance to Planting Fields off Chicken Valley Road. These gates marked the entrance to Carshalton Park near London, England, until 1919 when Mr. Coe acquired them from Lord Wittenham. They had been made by the English craftsman, Thomas Robinson, in the early eighteenth century. The gates are opened only on very special occasions, because of the narrow, winding road. The Arboretum and the parking fields are entered from Planting Fields Road, along a drive which is lined by splendid old European beeches.

In 1949 Mr. Coe presented his estate to the State of New York as a public arboretum and horticultural training center. He left funds for its further development and improvement to be administered by the Board of Trustees of the Planting Fields Foundation, of which his son, W. R. Coe, Jr., is the Chairman.

After his death on March 14, 1955, Planting Fields came under the administrative control of the State University Agricultural and Technical College at Farmingdale, Long Island. Shortly thereafter, the development of a Synoptic Garden was proposed at a meeting of the Advisory Board. Members of the Board, which include Dr. Clement G. Bowers, Frederic P. Lee, Dr. Henry T. Skinner, Richard Webel, and Dr. Richard White, emphasized the desirability of having an area set aside in which the best ornamentals would be represented for study by students and by home owners.

In accordance with the Board's recommendation, the Synoptic Garden will not be botanically complete in representing all genera and species of woody plants, but will have only such superior species, varieties, and cultivars as may be considered worthy of use as ornamentals. It is expected that the garden will eventually contain over four hundred different species, varieties, and cultivars.

Designing the garden was a challenging assignment, especially since none was known to exist which might be consulted for ideas or suggestions. About two-thirds of the total area of five acres is devoted to groupings of three, five, or more plants of each species or varieties of selected shrubs. The rest of the area is given over to small flowering trees, ground covers, turf, and garden ornaments. The plants are arranged in alphabetical order, which facilitates locating any given genus for study. In the A-B section are *Abelia, Aesculus, Aronia, Berberis, Buddleia, Buxus,* etc.; in the R section are *Rhododendron, Rhus, Rosa,* etc. Each plant bears a plastic label on which is engraved its botanical and common names, the family, and area of origin. When reading about this garden, one may find it difficult to believe that it has aesthetic appeal, but the alphabetical plant groupings are so arranged as to present attractive combinations and pleasing landscape effects.

An extensive section is now being prepared to receive a collection of rhododendron species which may be hardy in this locality, thus augmenting the original collections at Planting Fields.

A garden of hardy rhododendrons features the dwarfs. It received an award, and more than twenty plants in the garden were given blue ribbons.

A GARDEN OF DWARF RHODODENDRONS

By MARY FLEMING

Mrs. Fleming, Technical Assistant in the Cryptogamic Herbarium of The New York Botanical Garden, is actively interested in both the American Rhododendron Society, and an officer in its Tappan Zee Branch, and the American Rock Garden Society, of which she is Vice President.

THE MEMBERS of the local chapters of the American Rhododendron Society exhibited a garden at the forty-fifth International Flower Show, in 1962, at the Coliseum in New York City. We thought the hardy dwarf rhododendrons deserved to be better known and that a garden built around them would be unique as well as interesting. The garden displayed an outdoor living room with cross-sections of tree trunks making up the patio, and three sides enclosed in a split-rail fence. The background was of woven matting. Had space permitted, a coniferous lineup of pines, hemlocks, and yews would have been ideal. When the leaves of the large rhododendrons curl in freezing temperatures, their forlorn appearance melts into such a background. A light background is to be avoided.

All the plants had been dug from the gardens of a dozen members living in Connecticut, New Jersey, and New York. The plants would also have been suitable for a woodland garden, a shrub border, or a so-called foundation planting, although I would not choose the latter. In my opinion, foundation plantings have lost their usefulness with the modern ranch type house. Instead I would champion the use of evergreen ground covers such as the prostrate junipers and bearberry, *Arctostaphylos uva-ursi,* for full sun in which they revel, and *Shortia galacifolia* and *Galax aphylla* for the shady exposure, to mention a few of the less frequently grown kinds. The use of a hybrid clematis vine rising from such a cover to drape an entrance way, a wall, or a picture window of the low-slung house would give a beautiful effect. The heavy plantings were more in keeping with the house of two or three stories, very often masking an ugly, high foundation. Speaking of picture windows, the dwarf rhododendrons would be most desirable fronting an already existing boundary hedge or in the foreground of conifers and tall-growing rhododendrons in a "skirting" fashion

Left. Rhododendron 'Windbeam' shines in early spring.
Below. *Rhododendron racemosum* is at home in the rock garden.

Dwarf rhododendron 'Mary Fleming' grows happily in this patio garden. Its elegant blooms and attractive winter buds are to be seen in inserts.

some distance from the house so that the picture window is indeed a picture.

The trees in the exhibit garden were white dogwood and the silver-bell, *Halesia monticola.* Equally suitable would have been, among others, the sourwood, *Oxydendrum arboreum,* or a magnolia. The large-leaved rhododendrons were 'Roseum Elegans', 'Album Novum', and the frilled lavender 'Everestianum' among the so-called "Ironclads," and the more dwarf, compact Caucasicum hybrid 'Boule de Neige', so aptly named. A popular Dexter hybrid, introduced by Paul Vossberg of Westbury, Long Island, was 'Scintillation', a truly scintillating pink; it was set along the rail fence on the right, and at the opposite side was the attractive, medium-sized 'Wilsoni', also known as 'Laetevirens', which is slow to flower, but worthwhile for its foliage alone. The evergreen hardy azaleas on view were 'Delaware Valley White', white 'Palestrina', rose-pink 'Allure', the bizarre white, purple-striped 'Geisha', and 'Purple Splendor'. The species deciduous azaleas are among the hardiest of the rhododendrons, and the white *R. vaseyi* and pink *R. mucronulatum* added their charms.

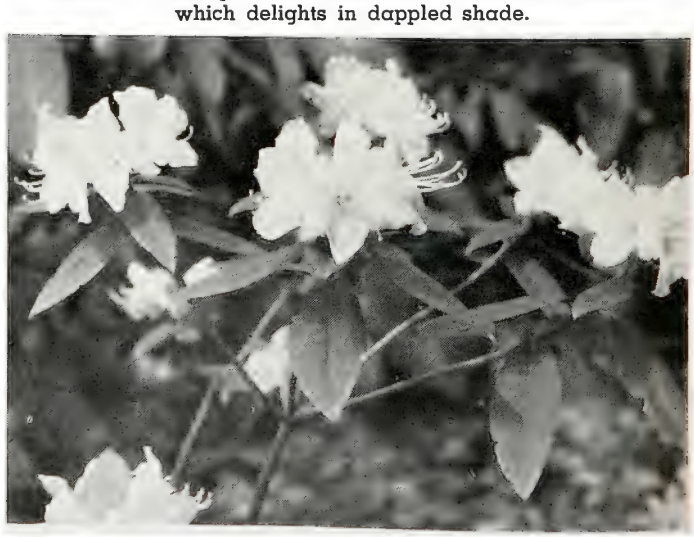
With the exception of two, all the dwarf rhododendrons in the exhibit garden, thrive in full sun. Once planted on a well-drained site in a soil composed of good loam and coarse peat moss, half-and-half, mixed thoroughly together, rhododendrons look after themselves. They insist on a permanent mulch; mulches which I prefer are oak leaves or pine needles, the latter being more in scale with the dwarfs especially when they are planted in the rock garden. Peat moss is not a satisfactory mulch; it robs the plants of moisture.

Dwarf rhododendrons are evergreen and early bloomers. Their flower buds, which are set in the fall, add much to the attractiveness of the plants during the winter, and indeed, they are decorative plants throughout the year. Among the outstanding dwarf hardy rhododendrons are those introduced by G. G. Nearing of northern New Jersey. He has developed a strain of the species *R. racemosum.* For many years he has been growing seedlings and selecting the hardiest and best form as to color of flower, shape and size of plant, and ability to live in our northeast climate. In its native western China, *R. racemosum* is a leggy plant of varying heights, and it has white to pink flowers. Mr. Nearing's strain is a compact plant, about a foot and a half high and twice that spread in a plant a dozen years old, with flowers of a pleasing pink; and it is perfectly hardy. It has reddish stems and tiny, bluish green leaves. Racemosums are especially effective when planted in masses on a shady bank. A single plant in the rock garden is a delight.

Mr. Nearing has been working just as assiduously with *R. keiskei* from Japan. This species has yellow flowers, with a greenish cast, on loose branches when young; but the plant becomes more compact with age, reaching a height of four to five feet. These are the two dwarfs which prefer shade. Unfortunately *R. keiskei* had spent its bloom before the show, but one of its undisseminated hybrids aroused interest. Another of its hybrids, not exhibited, *R.* 'Mary Fleming' *(R. racemosum* × *keiskei* × *keiskei)* was introduced by Mr. Nearing some years ago. It is a plant three feet by six feet after more than twenty years, and by April 20th is enveloped in its yellow flowers lightly tinged with pink.

Rhododendron 'Roseum Elegans' and *Clematis* 'Henryi' are harmonious companions.

Here is a close-up of the flowers of *Rhododendron keiskei,* which delights in dappled shade.

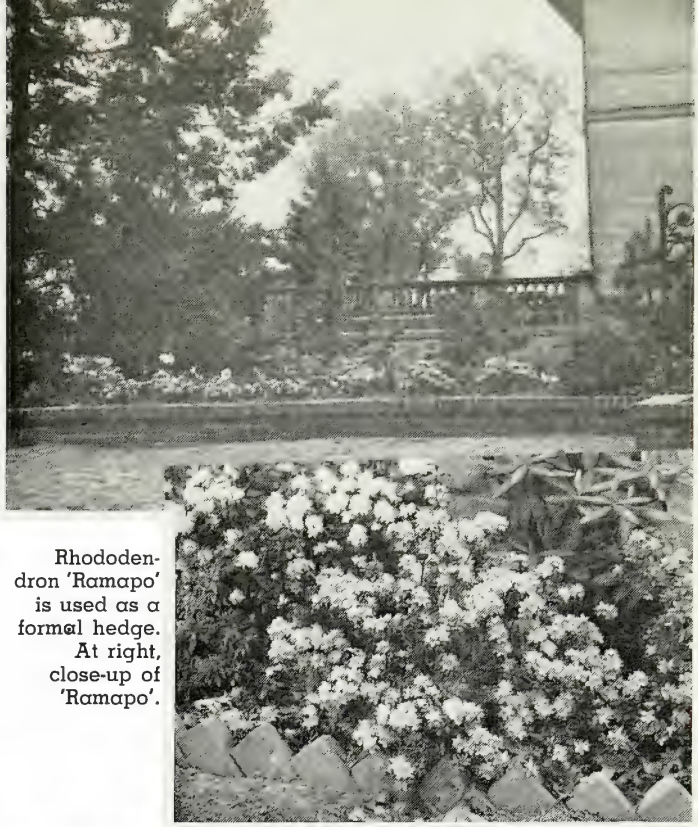


Among Mr. Nearing's hardy, dwarf rhododendrons which have received wide acclaim are 'Ramapo', 'Wyanokie', and 'Windbeam'. These were a huge success at the show. 'Ramapo' *(R. carolinianum × fastigiatum)* is a bewitching floriferous dwarf, with bright violet-purple blooms in early May. Thriving in full sun, it is admirably suited to a patio planting. It is low-spreading, wider than high, and the new growth of its tiny leaves has a glaucous tinge which makes a delightful contrast. In winter the plant takes on a plum-purple hue, giving it another beautiful aspect. Its uniform habit lends itself to use for an unusual hedge. In the company of white and clear pinks, Ramapo's blueness is highlighted, while flowers of purple and purple-pinks lessen it. Light shade also accentuates its blue cast.

'Wyanokie' and 'Windbeam' are seedlings of *R.* 'Conestoga' *(R. carolinianum × racemosum)*. 'Windbeam', after eighteen years in my garden, is a perfect mound about three and a half feet high and almost as wide. In the first days of May its flowers open white, changing in a few days to a pale clear pink. Standing in full sunlight, 'Windbeam' is a veritable prima donna.

'Wyanokie' is dwarfer than 'Windbeam'. After twenty years, it has developed into a plant three feet high and five feet in diameter. Its flowers are pure white.

Even young dwarf rhododendrons give their bountiful blooms in early spring. A mixed massed planting of them is both harmonious and beautiful. Many plants were not, of course, exhibited in the garden of hardy dwarf rhododendrons, since, being forced, they came into bloom either too early or too late. Clement G. Bower's *Rhododrendrons and Azaleas* (1960), David G. Leach's *Rhododendrons of the World* (1959), and Frederic P. Lee's *The Azalea Book* (1957) will take you exploring for these little gems as well as the big rhododendrons.



Rhododendron 'Ramapo' is used as a formal hedge. At right, close-up of 'Ramapo'.

Above. 'Wyanokie', a compact dwarf rhododendron, has pure white flowers.

CEREUS BUSINESS

By MARJORIE WIHTOL

Mrs. (Karl) Wihtol successfully grows a great variety of plants in her greenhouse on a farm in Middletown, New Jersey, many of which she has collected during her travels to foreign countries. Mrs. Wihtol has previously contributed to *The Garden Journal,* also to *The Cactus and Succulent Journal* and other publications.

EVERY SUMMER, sure as crabgrass, suburban and rural newspapers break out with photographs and reports of a dramatic event: the flowering of a "night-blooming cereus." The pictures show an ecstatically beaming "Mrs. Greenthumb" standing by a large, tubbed plant with striking white flowers, and the captions explain that friends, relatives, neighbors, and connoisseurs have come from miles around to share her delight at this breathtaking, photoflashed moment.

However, lovely as this cactus is, and talented as is Mrs. G. in bringing it to bloom, rarely is the plant in the picture a true cereus. It is usually *Epiphyllum oxypetalum,* one of about twenty species which are related to the hybrid "orchid cacti" and kin to Aunt Martha's "Christmas cactus," *Zygo-*

Below. 'Delaware Valley White' contrasts pleasingly with 'Sherwood's Red'.

cactus truncatus. It is neither a rampant vine nor a telephone pole, but a manageable shrub, happily devoid of the painful spines that characterize so many of its relatives. At maturity, which requires about six years, this plant is man-high or taller, with many branches growing from the base and from the older branches. The old stems are woody and trunklike, and the young ones are long, smooth tubes which later become flat, leathery, scalloped, and leaflike. The large, fragrant flowers arise from areoles on the margins, and from this habit the generic name, *Epiphyllum,* was coined from the Greek words for "upon" and "leaf." The fruit is said to be tasty.

As Mrs. G.'s' plant is a rain-forest native, its cultural needs differ from those of the more common desert cacti. Begonia or African violet treatment suits it well; the soil should be rich, porous, slightly acid, and quite moist during its active season, which begins about February. Too much sun will yellow it and eventually kill it. A summer outdoors in speckled shade suits it nicely, and occasional snacks of a mild fertilizer are welcome. In winter *E. oxypetalum* can be stored in a heated cellar, attic, or garage, during which time it should be kept quite dry, even to the point of shriveling.

Last summer a twelve-year-old plant of mine bore a total of over three hundred flowers on three nights about a month apart. Friends and neighbors, blasé by now, came from hundreds of feet. A man in New England who has *E. oxypetalum* in quantity, sets the plants out as a hedge in late spring and directs lights upon them on their flowering nights. The news is broadcast in advance. Many of the sightseers believe it to be a perennial hedge.

Epiphyllums and the true night-blooming cereus vines do have much in common. Both groups are epiphytic; they live high in the branches of jungle trees which they use for support but not for nourishment, since they are not parasites. They are all native to the central portion of the double American continent and to the West Indies. Most of them have large blooms, sometimes fragrant, and usually white to make it easy for the pollenizing insects to find them. Unlike the epiphyllums, the cerei bloom but once every summer. By noon the following day, the flowers are dank, stringy rags.

It is amusing to "force" these flowers to open a few hours ahead of their regular time on the dinner table. About mid-afternoon preceding the evening of bloom, the buds begin to break and show color at the tips. They may then be twisted from the stem, impaled, dry, on a pin holder, and placed in the dark; thus deceived, they will begin to unfold at about seven o'clock. The motion is visible. If the flowers are of *Epiphyllum oxypetalum,* no sweet dessert should be served to compete with the fragrance that will fill the room.

A puzzling fact about night cacti, as well as some orchids and perhaps other species, is that within a certain area they all bloom on the same night. At one time I had three plants of *Hylocereus undatus,* a large, untidy vine, growing in our greenhouse. One was in rich soil among orchids at the humid, shady end of the sixty-foot structure, the second amidships in dry, sandy soil among desert cacti, and the third in a cold draft under a broken pane at the sunny end. Yet every year they all performed at once. Last summer my remaining specimen (three was a crowd!) bloomed the same night as the one at the Brooklyn Botanic Garden, about fifty miles away. The purpose, of course, is for pollenization, but no one seems to know what factors trigger this simultaneous display. Harry Johnson, a knowledgable West Coast grower, wrote in the *Journal of the Cactus and Succulent Society* (November-December, 1960, p. 191), "So far as I know, there has been no scientific explanation of why certain plants have this peculiarity. I noticed it some forty years ago in Guatemala. On horseback you could ride for hours and every plant would be in bloom. Next night you could not find one. Probably it is to insure fertilization by insects, and I am sure that on the flowering night some particular insect will be there waiting to do the job. It goes

Hylocereus undulatus.

Epiphyllum oxypetalum.

back, of course, to weeks before the flowers open; but when the plants are grown under very diverse conditions and still continue to flower at the same moment, a lot of suppositions are ruled out." Taxonomist George Kalmbacher of the Brooklyn Botanic Garden believes that the moon is the determinant, not of the actual opening, but of the inception of the bud. It would be interesting to know the geographical extent of this simultaneity. Do they bloom in Guatemala when they do in Brooklyn, New York, and Middletown, New Jersey?

Many of the night cerei perform well in a northern greenhouse, but they require plenty of room, root-free in or beneath the benches. Most of them head for outer space and coil around under the rafters, and little pruning or training is required to keep them out of the way. But that rampant rascal, *Hylocereus undatus,* requires unending policing to keep it from taking over the whole structure; it advances in all directions by means of spaghetti-like aerial roots. My remaining specimen now sprawls over a forty-foot length of elevated pipes.

Selenicereus pteranthus is a popular plant which has brownish outer petals. It crosses readily with the hylocereus, and the resulting fruits on each plant are worth a little tickling with a paint-brush. The former bears bristly red balls like Christmas tree ornaments, and the latter large, red leather "artichokes" which explode when ripe, revealing hundreds of seeds. Both are edible, but not delicious. I have never succeeded in self-fertilizing any of these cacti.

Dozens of varieties of the climbing cerei are listed in nursery catalogs. At least two are red-flowered—*Hylocereus bronxensis* and *H. polyrhizus.* Some of the *Weberocerei* and *Haageocerei* are pink, and *Harrisia perviridis* has grass-green blossoms. *Monvillea insularis,* a rather prostrate grower, is yellow. Of the three species of the creeping *Arthrocereus,* the one called *A. rondianus* has pink and lilac blooms. *Selenicereus boeckmannii* has the odor of Easter lilies, and *S. vaupellii* smells like vanilla.

Many of the erect cerei are also night-bloomers, but except for the multiple *Echinopsis* group, they rarely bloom until they are too large to be contained in the average house or greenhouse. Unlike the climbers, these are desert plants and prefer dry, sandy soil and as much sun as they can get. A favorite in many collections is *Cephalocereus senilis,* which grows only in the "Valley of the Old Men," about sixty miles northeast of Mexico City. This cactus attains a height of sixty feet or more and lives for several hundred years; fastidious owners shampoo and comb its long, white hairs. The monstrose form of *Lophocereus schottii* is also attractive at any size; it is smooth and bare and takes on lovely surrealistic shapes. The flowers of *C. polylophus* are dark red, of *C. chrysacanthus* pink, and of *C. chrysostele* olive-green. Other genera of columnar or treelike, night-blooming cerei are *Browningia, Stetsonia, Binghamia, Dendrocereus, Acanthocereus, Trichocereus,* and *Peniocereus,* a generous member whose flowers open for a second night—and, of course, just plain *Cereus,* a genus of about twenty-six species. At any rate, it would behoove "Mrs. Greenthumb" to retitle her epiphyllum, if only to call it "queen of the night," a phrase applied haphazardly to many of these plants.

TWO SPECIES OF MOSS AS CULTURE MEDIUM FOR ORCHIDS

By LINCOLN ADDERLEY

Mr. Adderley is a gardener at The New York Botanical Garden.

WE HAVE HEARD OF and tried many different media in which to grow orchids. Some of these work very well indeed, while others leave a great deal to be desired. However, it does seem strange that we have neglected to look into some of the natural media in which and with which orchids grow, the two most commonly met with in the epiphytic and semiterrestrial groups of orchids being the mosses and lichens. I have seen many of these orchids with their roots intermingled with lichens and mosses and have felt that this must be an almost perfect arrangement. Not only do the decomposing lower layers of moss offer some of the nutrients which the plants need, but the living upper layers help to provide a microclimate that is almost impossible to duplicate in culture.

One day in 1962 a small air-mail package arrived from my good friend Herman Slade of Australia, who had just returned from a collecting trip in the highlands of New Guinea. The plants in that package turned out to be none other than the marvelous little *Dendrobium sophronitis.* Among Herman's specific instructions was one to the effect that the plants should be rolled in a soft chunk of osmunda fibre. However at the time they arrived, we were completely out of osmunda fibre. It was then I decided to put two species of moss, on which I had had my eye for some time as possible culture-medium, to the test. I did not want to put the small plants in bark, since I felt that they might starve before they were properly established.

The two species are *Thuidium delicatulum,* the fern moss, and *Hypnum imponens,* both quite common and better known in the trade as "sheet moss." They are frequently used for decorative purposes, for covering pots in shows and so on, and for creating naturalistic effects. They grow mostly on half-rotted trees and logs on the forest-floor, forming sizeable sheets.

After potting the little plants of *Dendrobium sophronitis* in the moss, I watched them closely for the first few months to see what sort of root action would develop. I found that they responded very well, and was so impressed with this

Left. *Dendrobium sophronitis,* growing in *Hypnum imponens* for approximately a year and a half, has a vigorous root system.
Center. *D. sophronitis,* growing in osmunda fibre for the same length of time, did not develop as good a root system.
Right. *Oncidium leucochilum,* propagated from a single pseudobulb, shows new growth and roots.

first trial that I decided to carry out the experiment on a broader scale. I used back bulbs, duplicate and surplus plants in the test and mostly debris and clippings from the sheet moss, which is regularly used in the Garden's displays.

This experiment has now been in progress for approximately three years, and a considerable number of genera and species have been used with favorable results. The only genus which has responded with little or no success is *Paphiopedilum.* At first the cypripediums refused to develop any roots at all, but when I made pH tests and found that both species of moss were acid, considerable light was thrown on my *Paphiopedilum* problem. After liming, they made considerable recovery and are now flowering.

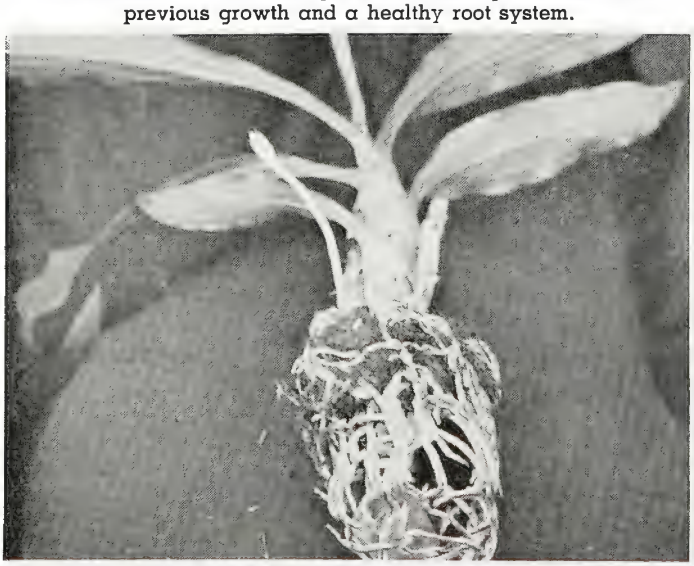
These two species of moss make, I believe, an excellent potting medium—certainly it is the easiest material I have ever used for this purpose. It is quite soft and, if pulled apart in small pieces, can be worked in between the roots easily with little or no damage. The moss should be packed loosely, using the fingers only; if packed too tightly, it will tend to mat, preventing both proper drainage and free air movement through the medium. The second important feature is that the moss holds moisture longer than osmunda, bark, or the bark mixtures. If the pots (five- to six-inch) are soaked thoroughly at the time of watering, the plants will go ten days to two weeks, even longer in some instances, before they will need to be soaked again. The third good point is that slugs and small, black snails, which do so much damage to the young roots, find it difficult to maneuver in the moss; it really is impossible for them to hide in the containers and consequently control is easier and root damage cut to a minimum.

There may be two disadvantages in using this material. In the South or warm countries where so many orchids are grown outdoors, if the annual rainfall is over thirty inches and seasonal, the moss might remain wet over too long a period, thereby causing root rot. And orchids requiring a higher pH or a slightly alkaline medium may do poorly, unless liming is done.

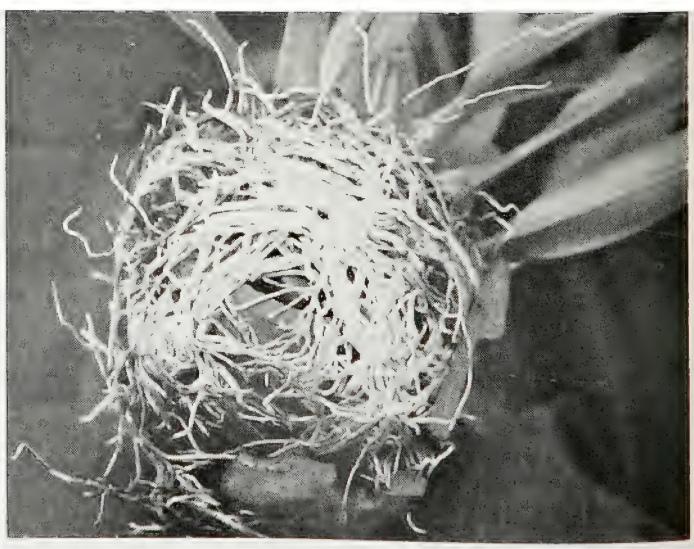
An interesting thing about both these two species, *Thuidium delicatulum* and *Hypnum imponens,* is the pH reaction, which I have been watching closely. It is acid—between 3.5 and 4.5. I have had pH tests done on fresh moss and on moss in which plants have been growing for various periods of time—six months, one year, two years, and three years—with little change in the basic pH reading. While these values are lower than what we are accustomed to, there have been no unfavorable results thus far, except with

(Continued on page 120)

A backbulb of *Catasetum pileatum* showing increase over previous growth and a healthy root system.



Remarkable root system and healthy growth of *Oncidium atlissimum* from a moss-culture medium.



PLANT THE RIGHT TREE

By A. F. DeWerth

Dr. DeWerth is the Head of the Floriculture Section of the Department of Soil and Crop Sciences, Texas A&M University, College Station. The following article is based on his Departmental Information Report No. 1.

OUTDOOR SPACE must be developed to conform to modern living. The proper organization of this space is largely dependent upon the careful selection and location of all the elements involved in a well-designed landscape.

Trees are not only an integral part of such space organization, but in the majority of cases, they are the most important element in the solution of landscape problems. Their roots, trunks, and branches form the framework of a landscape design just as steel, bricks, and mortar form the framework of a building. Their selection and their placement are a responsibility which should not be lightly assumed. In fact, their selection and their placement are the most permanent operation in the development of landscaped areas, since trees, once planted, are seldom moved.

The most widely accepted horticultural definition of a tree is a woody plant with a clearly defined trunk. This is largely an academic distinction, but it is not as abstract as it may seem, and should serve as the basis in selecting trees for landscape use.

The distinctive growth-habit of a tree provides an accent point in landscape design. Therefore, when restraint is not practiced and trees are scattered indiscriminately throughout the area being developed, a restless and disconnected composition results.

Every plant inherits characteristics from the parent plants from which it originated—bark, foliage, flowers, fruit, habit of growth. These characteristics are similar, but not necessarily exactly identical. Each plant possesses an individuality all its own, its mark of distinction.

Trees can be classified in several ways—deciduous or evergreen, flowering or non-flowering, with showy fruit or without, fast-growing or slow-growing, and so on. However, certain characteristics are of such important consideration in the selection of trees for landscaping that they will be dealt with in some detail.

SIZE. Trees should be classified for size only in broad terms—such as small, medium, large—since their development may vary widely depending on climatic extremes, exposure, soil conditions, availability of water, and last but not least, the care they receive after planting. Any one of these factors could make unreliable such a designation as "the tree will reach a height of sixty feet with a forty-foot spread at maturity" in many situations.

Small trees are those which rarely, if ever, attain an ultimate height of over twenty-five feet.

Medium trees reach an ultimate height of from twenty-five to thirty-five feet.

Large trees will reach a height of forty or more feet at maturity.

FORM. This is perhaps the most exacting requirement for the proper use of trees. They may be generally classified as having an erect or spreading form. Those with an erect habit of growth may be further divided into columnar, narrow-upright, and broad-upright, while spreading trees are also often referred to as wide-spreading to illustrate the degree of spread. Round-headed trees may have a compact, dense head of foliage or an open-airy arrangement of foliage.

Erect trees are upright and narrow with a slender, towering effect. The more extremely erect are said to be fastigiate or tapered to a point. They are useful for accents in massed plantings or to accentuate the vertical in architectural detail. The columnar types have the same growth characteristics but lack the acute tip and are usually referred to as narrow-upright or broad-upright, as the case may be.

Spreading trees are of free natural growth and require considerable space to develop fully. The limbs extend in a lateral direction, often forming flat tops. Wide-spreading trees frequently have a branching habit suggestive of the horizontal. When this growth is extreme, these types are sometimes injured in heavy storms; and so they should not be planted where exposure to high wind is anticipated. Such trees tend to become picturesque in old age.

Open-headed trees are typically indistinct in outline as well as loose and open in structure, creating little impression in form or mass. Their main value in landscape design is their tracery against the sky, or the light shadows they cast upon the ground. Trees which are described as "irregular" usually possess this characteristic, and they are better planted in groups or backgrounds rather than as individual specimens.

Round-headed trees have crowns which form an arc in outline and are curving in configuration. They produce this form emphatically with a close branching habit which provides a dense textural effect.

Pyramidal trees normally have only a single stem or trunk, rigid and severe, with the branches arising at right angles to it or bending in a sweeping manner and thus making them appear as though they rise in layers. The outline has a cone-shaped effect with enough regularity to accent the tip or apex. This type of tree varies in configuration and width to the extent that it may be classed as narrow- or broad-pyramidal.

Umbrageous trees have an open-headed, round-topped habit of growth which forms a natural canopy with limb structure and foliage arrangement, suggesting the shape of an umbrella. Some trees which have a decidedly different form than this during youth and middle age, will assume this characteristic form at maturity, or may have it forced upon them in earlier stages of growth by prevailing winds.

Weeping trees have branches which hang freely from the trunk, the tips of the branches dipping toward the ground. Their rather unnatural-looking form limits their use to flat surface, or to offset the slope of a steeply pitched roof.

TEXTURE. Since the textural quality of trees is a surface aspect, it is frequently overlooked and not given due con-

sideration. Texture has a scale relationship to architectural structures and outdoor space.

Dense- or coarse-textured trees are those with dense, large, and heavy foliage, heavy trunks and branches. They possess the appearance of being self-contained rather than expansive. They dwarf an area, especially one which is enclosed by walls or hedges or a group of buildings. This type of tree is useful when noise abatement is necessary.

Open- or medium-textured trees are less definite in form than those with coarse texture and are not as strict or severe in outline. The body of the tree, the arrangement of the twigs and leaves are more open. Trees of this type relieve the heaviness of architectural structures and create an impression of greater space in enclosed areas.

Filamentous-textured trees are lighter and more airy than medium-textured trees. The branches, twigs, and leaves are small and slender, producing an extremely fine textured effect. The line effect is more pronounced and the feathery foliage valuable in creating the illusion of space, especially when these trees are placed behind coarse-textured plants.

Besides the purely structural characteristics of size, form, and texture, trees possess qualities which are very important in the aesthetic design concept. Consider the color of foliage, for example. Dark green leaves convey a feeling of solidarity; they produce serious and sometimes somber effects and appear at their best against architectural backgrounds. Light green leaves aid in creating the illusion of distance, thus expanding the apparent size of a given area. And they have a tendency to lighten it. Trees with refined foliage, not only small in size but elegant in shape, also appear to increase the size of an area, and they blend with smooth architectural surfaces.

The environment in which a tree thrives and reaches its greatest expression in form and vigor is an important consideration when selecting trees. An adverse growth factor may place a tree under a handicap difficult to overcome. A starved, disease-ridden tree, struggling for existence, does not possess the landscape merit of one in a healthy condition.

In the South and Southwest, consideration must be given to the problem of heat. Trees which can endure high temperatures without visible evidence of distress, which can be planted in a pocket subjected to intensified heat, or in a location surrounded by paving, must be carefully chosen.

In areas where drought prevails, trees resistant to this condition must be used. Drought-resistance is centered largely in the cellular structure of certain trees, enabling them to endure long, dry periods. The pores of their leaves close against excessive transpiration, or their roots go down deeply into the subsoil for accumulated moisture at that level.

In urban areas where smoke, dust, gases, and other atmospheric contaminants exist, species or varieties of trees known to be resistant to the toxic and clogging effects of air pollution should be sought. And such trees will perform more satisfactorily if provided with cultural advantages, such as excellent drainage to prevent the soil from becoming impregnated with impurities.

Highly alkaline soils which prevail in some sections of Texas are unfavorable for good plant growth; this condition results from an accumulation of soluble salts. While a limited number of trees can be planted where this condition exists, every effort should be made to overcome, or at least reduce it as much as possible. The only rational and lasting solution of this noxious problem is adequate drainage so that the accumulating salts will be thoroughly flushed through the soil at periodic intervals.

There are also a number of practical points to be borne in mind in tree selection:

RATE OF GROWTH. Where there are no trees at all, shade, background, and framing requirements may dictate rapidly-growing trees rather than ones of medium or slow growth.

LIGHT CONDITIONS. The light conditions prevailing where a tree is to be planted have a definite bearing on the choice, since some trees thrive in a sunny location, others in shady or semi-shady locations. This applies particularly to small trees.

EXPOSURE. The prevailing wind on the site to be landscaped should be carefully studied. When the wind is strong, trees having brittle or soft wood or a shallow root system should be avoided.

UTILITIES. The location of under-ground drains and other utilities should be checked to determine whether the tree roots would interfere with them, if the trees have vigorous water-seeking roots.

MAINTENANCE. Time and money will be expended in additional maintenance if the trees are susceptible to serious attacks by insects or disease, or if they shed leaves, portions of bark, fruit, or other litter which must be removed periodically. These points must be considered.

LOCATION. A tree which is to be planted close to the house should have a straight, clean trunk and a high canopy to shade the house. A low-branching type in this location may become a nuisance. For screen plantings, low-branching trees are recommended.

Trees to be planted on the lawn should not cast deep heavy shade, since lawn-grasses have difficulty in surviving under such conditions. Trees with open foliage and a deep root system make desirable specimens on the lawn.

Blessed rain, cooling delight of water . . . Ring, silver kisses with which the thirsty earth receives the patter of the drops; roll on, flying veil of water, washing all. No miracle of the sun can equal the wonder of the blessed rain. Run, troubled water, through the tunnels of the earth; water and loosen the thirsty matter which binds us prisoner. We all breathe again, grass, and I, and soil; and all is right with the world.

Karel Capek in *The Gardener's Year*, 1931

FLOWERS, INSECTS, AND EVOLUTION

By HERMAN F. BECKER

This article by Dr. Becker, who is a Research Associate at The New York Botanical Garden, was published in *Natural History* and is reprinted in these pages with permission of *Natural History,* published by the American Museum of Natural History.

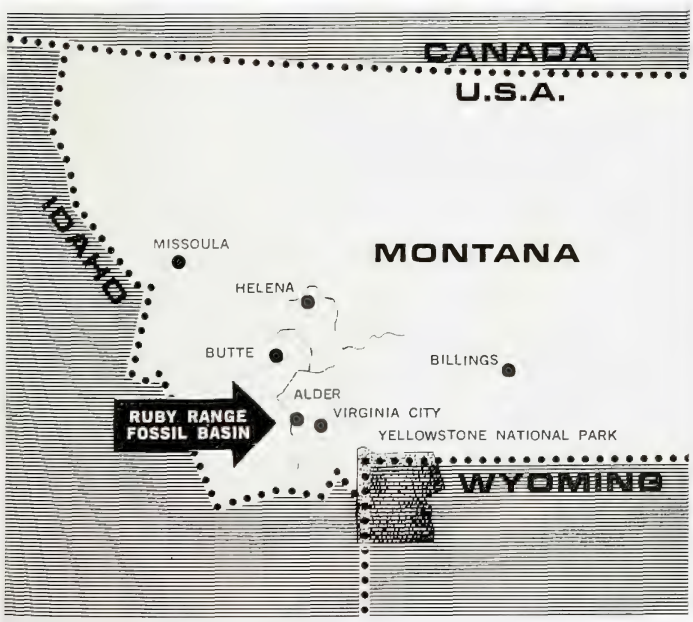
ANY ENDEAVOR TO UNRAVEL the evolutionary history of our fascinating flower-insect relationships reveals divergent interpretations among scientists. For such an undertaking a comprehensive knowledge of the natural sciences is required, especially of geology, botany, entomology, and, above all, of paleobotany, paleoentomology, and evolution. Many people realize the existence of interdependence between some plants and insects, but few are aware of the aeons during which this process reached its present state of development. Evolution has no definite end result and never a deliberate, predestined direction. It is expressed by a high degree of specialization and an intricate relationship which has developed into such widely divergent biological entities as the flowering plants and the insects.

First, of course, we must consider the interdependency between plants and insects that exists in nature today; then we must apply the dictum, "The present is a key to the past." The geological record presents a chronicle of four hundred million years of fossil life which can be traced through each subsequent younger formation. The evolution of each living plant and insect has been a continuous chain of events, which, if broken, would have resulted in extinction. In turn, a complex and harmonious interdependency—or mutualism—exists between many plant and insect species. If interdependency is disrupted, death may result.

Early organization of flower structures appears to have been a slow, gradual process of adaptation and specialization without functional stimulus by insects. When the first insect-like animals appeared during Devonian time, the evolution of highly specialized reproductive structures among such plant groups as the seed ferns, the treelike club mosses *(Lepidodendron, Sigillaria)*, and the giant horsetails or scouring rushes *(Calamites)* was already well on its way. Early "insects," according to fossil evidence, were doubtless primitive, wingless, and unspecialized. Their food requirements were not restricted but may have comprised a varied diet of decaying debris.

The reasons for the sudden rise and expansion of the angiosperms—the higher plants, which have seeds enclosed in an ovary—are still shrouded in mystery, but a phylogenetic plasticity, coupled with favorable ecological opportunities, surely played a major role in their rise. Their explosive diversification and dispersal in the late Cretaceous and early Tertiary nearly parallel an equally momentous rise and diversification, or speciation, among the insects. An intimate interdependence between these two groups, therefore, must be considered a relatively recent geological phenomenon—one initiated about seventy million years ago. Earlier relationships probably contributed little to the eventual physiognomy and requirements of either plant or insect.

Nothing in nature is constant but change. Organic evolution, expressed in terms of phylogenies, is "descent with modification" as a function of perpetual genetic variation, mutation, and natural selection. Those traits which do not contribute to species survival are gradually discarded. In rare cases, according to fossil evidence, species remain in a state of what might be called "evolutionary suspension," or status quo, that is, they have changed relatively little either because their environment has not changed or because they are adapted to a wide range of environments. Examples are the "living fossils" of the dawn redwood *(Metasequoia),* the katsura tree *(Cercidiphyllum), Ginkgo,* and, to some extent, the roses. Among the insects, the dragonflies, roaches, and silverfish fit into the living fossil category.



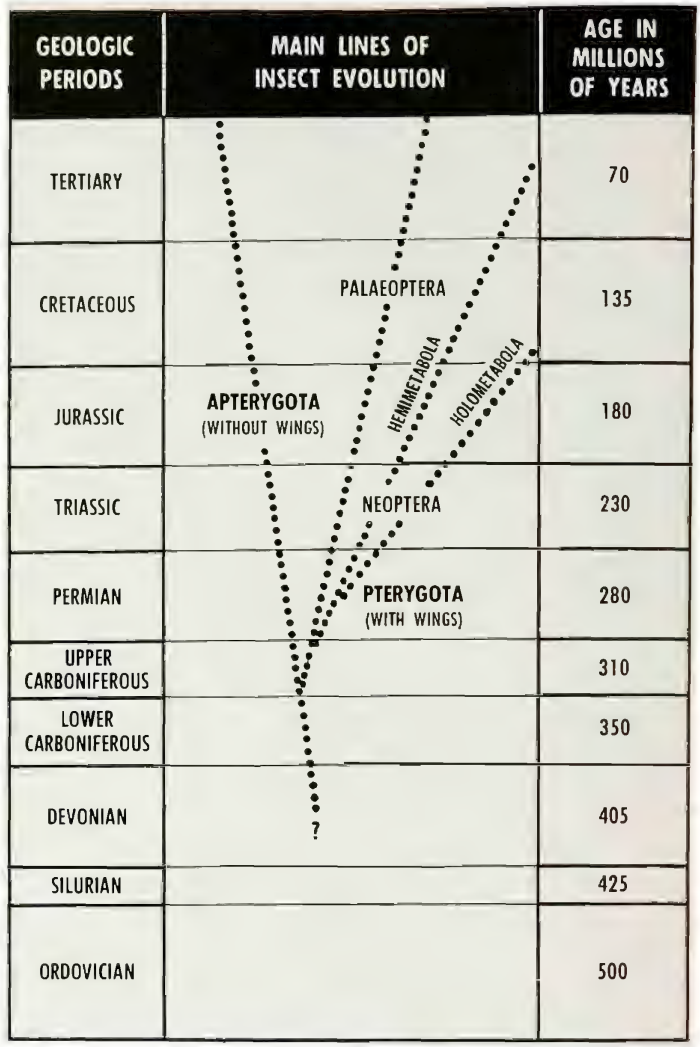
Metzel Ranch in the valley of the upper Ruby River in Montana. Fossil sites, where Dr. Becker collected some twelve thousand plant and insect fossils, are located in the distant benchlands.

Essentially, then, over a long period of time, each gradual and minute change in both flower and insect morphology was triggered by subtle genetic and environmental changes. In some cases, our interpretation of an early phylogeny is only as valid as the fossils on which it is based, and additional fossil material, as it comes to light, frequently causes one to reconsider and modify previous conclusions. This procedure permits a flexibility to amend previously established plant-insect relationships according to new evidence.

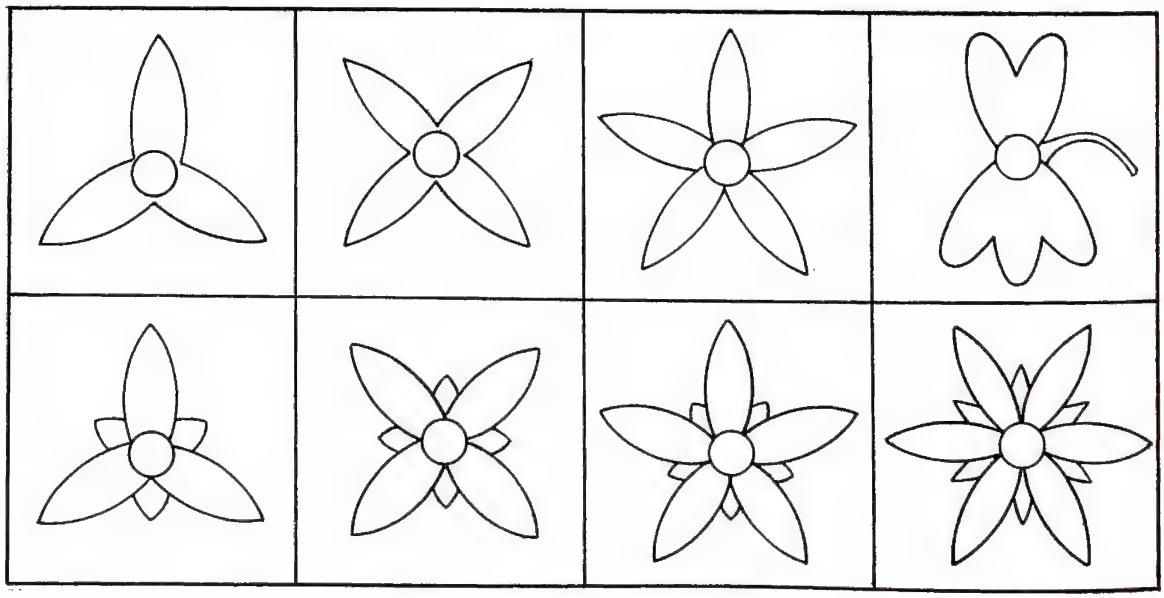
Some of the early insects of the Carboniferous and Permian periods were doubtless carnivorous or omnivorous, while herbivorous forms were destructive to plant life. It has been suggested—as a hypothetical beginning to plant-insect interdependencies—that there gradually appeared cells which secreted nectar. These surrounded the reproductive (flower-like) regions, and the feeding activities of insects began to be channeled toward such central lures. This may have resulted in the preservation of vegetative structures and, concurrently, promoted the transfer of microspores and insured pollination. From such convergent developments arose a beneficial mutualism—for plants and insects alike.

It is sometimes assumed that flower types were determined by their exploiters, the pollinators. To the uninitiated, the examples are superficially plausible when one says that "bumblebee flowers," such as clover, arose in response to specific structures of the bumblebees; that "bird flowers," such as cardinal-flower or trumpet-vine, arose in response to parrots and hummingbirds; and that "bat flowers," *Kigelia* (the tropical sausage tree) or certain cacti, developed in response to bats. Such reasoning assumes an independent "leading" development of the fauna with a resulting adaptation of flowers to their visitors. It can hardly be argued that the insects are the sole exploiters of flowers for food as long as the flowers equally "exploit" insects for pollination—an exchange which results in harmonious relationships to each other's advantage.

Many instances of insect behavior toward plants may be traced to functional structure, color, or fragrance in plants, and one might be tempted to say that insects "behave" in a particular fashion because of these attributes. Whether the insects directed or caused the evolution of flowers to conform to their own entomological specializations is certainly not decipherable from the geological record. But if they did so, it would follow that flowers must always have lagged behind insects in their optimum adaptation. It is more realistic to assume that reciprocal adaptation among primitive and advanced flowers and insects was achieved contemporaneously or in a limited, seesaw fashion.



Secretion of nectar is physiologically linked with flower maturity, the opening of stamens, and the discharge of pollen. Nectar glands, or nectaries, of the earliest flower types



Many insects distinguish flowers by petal and sepal forms, as in pattern combinations illustrated here. Upper row, petals from simple to complex; lower, with sepals. Recognition is the key in pollinating relationships.

attracted primitive arthropods of the class Insecta. Floral parts provide a region where sugars, starch, albumen, fats, and vitamins accumulate to be incorporated into developing fruits and seeds. Nectar and pollen thus furnished, then as now, a concentrated and palatable food for the arthropod visitors which "learned" to utilize these sources.

Today, insects are divided into two great subclasses, the wingless Apterygota and the winged Pterygota. Wingless insects entered the geological stage during early Devonian time and have remained relatively unchanged and primitive to this day. They contain the present orders of Thysanura, with bristle tails or caudal filaments and chewing mouthparts (silverfish), and the Collembola, minute — or even microscopic — vegetarian springtails. Only one in a thousand of all insect species is wingless today. Pterygota appeared somewhat later, but the exact time of derivation from the wingless forms is problematical, and the morphological changes resulting in wing development are still not clearly understood. The attainment of winged flight precedes that for reptiles and birds by nearly one hundred million years. This mode of locomotion obviously unlocked new vistas and evolutionary potentialities for the whole group. Nearly two hundred million years elapsed before the greatest number of insect species took to the air, coinciding with the early Tertiary ascendancy and diversification of the flowering plants.

Among the Pterygota, the Palaeoptera, or ancient-winged, had outstretched, non-flexible wings which could not be folded flat over their bodies. Dragonflies and mayflies are examples. They are mainly predaceous and evolved into the largest insects that ever lived. Fossil dragonflies with a wingspread of thirty inches are not uncommon. Toward the end of the Carboniferous Period, the Palaeoptera gave rise to the new-winged insects, the Neoptera, which could fold their wings. Today ninety per cent of all existing orders of Pterygota, comprising ninety-seven per cent of all species, belong to this group.

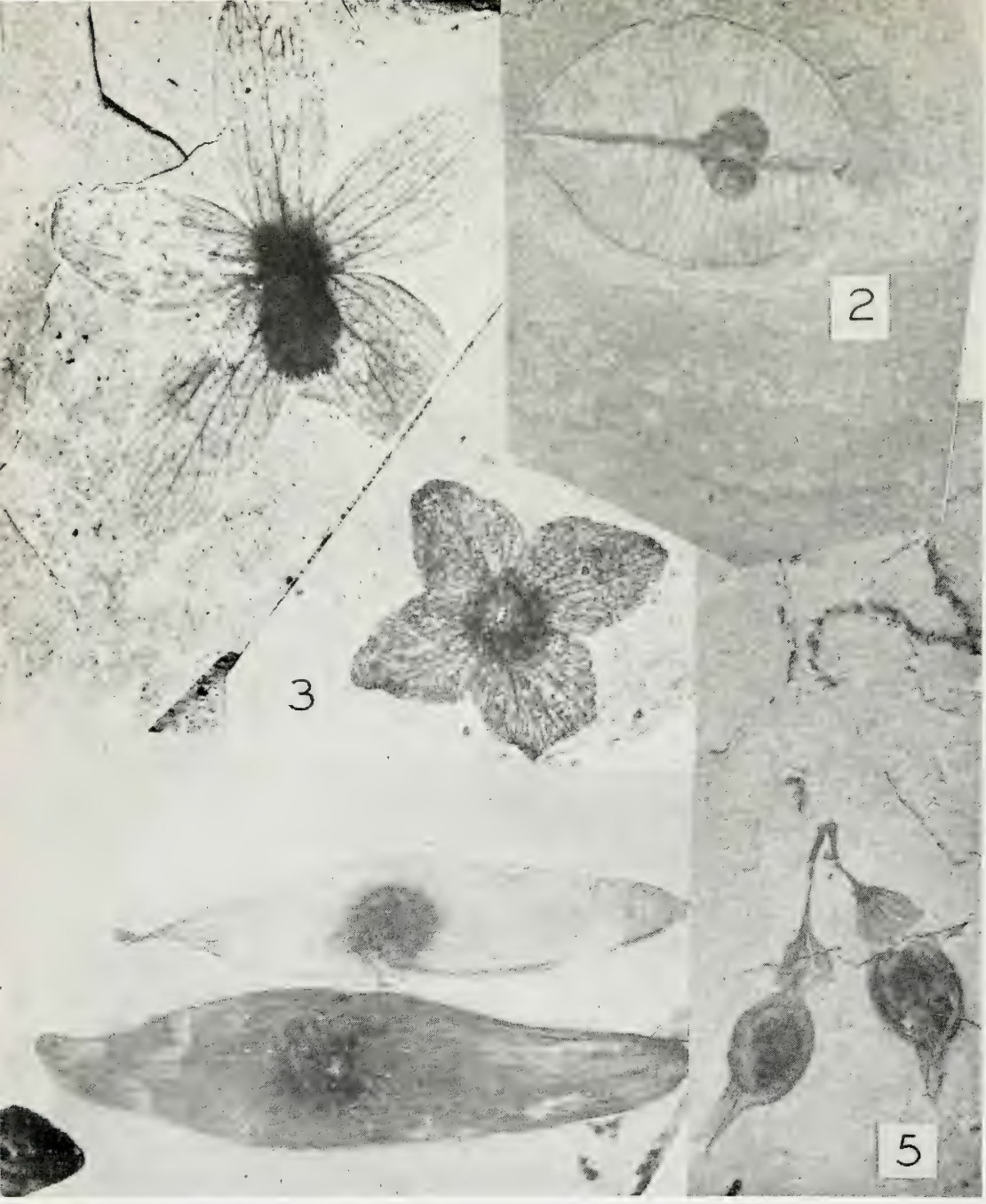
For the first one hundred million years after the origin of the winged insects, the air was shared with no other organism. They reigned supreme until the Jurassic and the advent of the birds, which soon turned the insects into a source of food. Neopterous insects of the Upper Carboniferous, related to our cockroaches and stoneflies, had an incomplete, or hemimetabolous, metamorphosis in which each

Left, fossil leaf of an alder, *Alnus relata* (Knowlton) Brown, of the *Betolaceae* suggests that its environment was once moist. Right, the fine venation of the compressions of an elm leaf, *Ulmus montanensis* Becker, of *Ulmaceae* shows excellent preservation.

stage was larger than the previous until adult size was reached. Insects with a complete, or holometabolous metamorphosis—that is, those which go through grub and pupal stages—appeared in Lower Permian times and comprised about five per cent of all insects. Today, eighty-eight per cent of all insects are in this group; their larvae and caterpillars differ from adults in structure and in food and ecological requirements.

One of the keys to the successful evolution of pollinating relationships is the faculty of insects to distinguish diagnostic forms of basic flower types consisting of a definite number of sepals and petals. Such structures, termed "numeral" patterns, were first recognized in "flowers," or fructifications, in the cycad-like plants of the early Mesozoic.

Left, wings of a praying mantis, *Orthoptera* of *Mantidae* and, right, the wing of a plant hopper, *Homaptora* of *Fulgoridae*.



1. Fossil compression of *Astronium truncatum* (Lesquereux) Macginitie of *Anacardeaceae*. The living flower is now in Mexico.

2. Fruit of goldenrain-tree, *Koelreuteria arnoldi* Becker.

3. Flower of a dogwood, *Cornus cornella* Becker.

4. Samara of the tree-of-Heaven, *Ailanthus americana* Cockerell. The small fruit is a fossil; the large fruit, a living specimen of *A. gladulosa* Desfontaines for comparison.

5. Fruits of elm, *Ulmus* species.

Gradually, through various evolutionary lines, they attained their present angiospermous complexity of ovary-enclosed seeds. Perhaps one evolutionary system of flower "type classes" may be equated with a complementary sensory evolution of pollinating insects. During the progress of natural selection, each previous sign of "recognition" on the part of the insects was augmented by a new, more adaptive, and more successful sign. Primitive, spirally arranged, beetle-pollinated magnolias of the Cretaceous, for example, gave rise to some modern species *(Magnolia denudata, M. coco)* with a radial symmetry and a more efficient pollination by Hymenoptera.

The following botanical terms in their evolutionary sequence telescope these trends:

Amorphic, or "structureless," extinct flower types usually possessed dense whorls of leaves or bracts, often without definite form, and growing beneath the floral reproductive structures. Some of the Triassic ancestral cycads with amorphic "flowers" *(Wielandiella)* attracted certain primitive beetles and roaches, and possibly some wingless insects which learned to associate the pollen and secretory food supply with the density of whorls of bracts or basal leaves of the flowers.

Haplomorphic, or "simple," flowers, in their often "spiral" arrangement of variously colored petals and sepals (the periath), trace their ancestry to the middle and late Mesozoic Era. Magnolias, the tulip-tree, and water-lilies belong in this group, which is considered to be one of the most primitive among the angiosperms.

Actinomorphic, or "regular," flowers have emerging "radial" and two-dimensional symmetries. Roses and peonies, which have all floral parts and nectaries on one level, are examples. Here are associated composite, radial forms of from three- to six-perianth segments which probably are perceived by the insect as a unit. Together with color and fragrance, these flower types represent a food attractant for certain flies or bees and a few other well-adapted pollinators, including beetles, which need no specific ability to gather the abundant pollen offered. No flowers of the truly radially symmetrical type have been reported from the Cretaceous Period.

Pleomorphic flower types (the root word means "more than

1. Snout-beetle or weevil, *Coleoptera* of *Curculionidae*.

2. *Coleoptera* sp. Note the ovipositor.

3. A tropical grasshopper, *Orthoptera* of *Eumastacidae*, common in the Ruby Flora, now extinct in the United States.

4. Beefly, *Diptera* of *Bombyliidae*.

5. The parasitic ichneumon fly, *Hymenoptera* of *Ichneumonidae;* and counterpart of the same specimen.

6. Steletto fly, *Diptera* of *Therevidae*.

7. Bumble-bee, *Hymenoptera* of *Apoidea*.

one"), with a four- or five-part recognition pattern, were found in Cretaceous beds, but they became abundant only in Tertiary floras. Some lily-like compressions of the Tertiary suggest bee pollination, as in modern, colorful monocotyledonous flowers, with a three- or six-part perianth. Flowers of the Mustard and Dogwood Families were first recognized in the Oligocene Ruby shale deposits of southwestern Montana, of some thirty-five million years ago. Bees (including bumblebees) and flies (including flower flies) were abundant by then and may have chosen specific flowers on which to feed.

Stereomorphic, or three-dimensional, often tubular flowers, with a symmetrical three-, five-, or six-parted perianth, are a late Tertiary derivative from pleomorphic ancestry. They include gentians, bellflowers, columbines, primroses, phlox, and daffodils. Their corollas protrude considerably above the deep-set and often concealed nectaries. Butterflies and hawk moths, some of which have refined adaptations of mouth parts (a long, curled tongue, for example) or certain bees (which, with long tongues or very small bodies, are able to force entry into the tubes) feed on and pollinate stereomorphic flowers.

Zygomorphic, or bilaterally symmetrical, floral development represents the highest and most intricate evolution of morphological structures in response to, or contemporaneous with a very limited number of pollinators whose sensory organization is attuned to a highly specialized perianth. These perianths offer complicated recognition patterns, together with nectar and fragrance, which must be grasped in their entirety, no matter how ornamented their symmetry may be. Zygomorphism crosses the boundaries of many families (orchids, milkweeds, legumes) and demonstrates what may be the ultimate in floral specialization. Orchids and their pollinators pose the greatest morphogenic and taxonomic problems to an investigator. They do not always conform to botanical criteria which are considered valid for other families. They possess unique pollen structures, the pollinia, which adhere as units to the visiting insect (often flies and moths) and are thus assured of delivery to a receptive stigma of the same species. Usually the highly adapted pollinators regularly visit the same kind of flower.

Throughout evolutionary time each flower type, from the amorphic to the zygomorphic, has corresponded to a concurrent level of sensory adjustment in those pollinating insects which had the greatest reaction to a particular plant. Such adjustments continue to evolve, if imperceptibly, without the sacrifice of previously existing, advantageous flower-insect relationships. The story of the present adaptation of insects to their flower hosts and the intricate endowment of flowers to lure, attract, trap, deceive, and feed pollinators to their own ends is a source of wonder. Even birds and bats entered the competition when specialized structures and functions, serving the pollination of the host, arose with equally efficient features for food requirements of the vertebrate visitors, resulting in an advantageous dependence.

Let us look at some specific aspects based on relatively

Above. A cicada, *Homoptera* of *Cicadidae*.

Right. Cranefly *(Tipulidae)* buried in the Ruby sediment during Oligocene Epoch more than thirty-six million years ago.

recent discoveries of plant and insect compressions. During the summer of 1947, I found the first Tertiary plant compressions in the upper Ruby River basin of southwestern Montana. I could not foresee, however, the significance of that find until I showed a shoebox full of fossil leaves and assorted insects to Dr. C. A. Arnold of the University of Michigan. He immediately recognized the scientific potential of the flora and encouraged me to expand the collection. Seven field trips followed during the next fifteen years with an accumulation of about twelve thousand specimens, including some two hundred species of plants and a great number of insect remains.

Among paleoentomological regions, the Oligocene Florissant sites of central Colorado had been the most lucrative and best-known in the United States; this fauna was exhaustively described seventy-five years ago by S. H. Scudder. The Ruby plant sites rank second only to those of Florissant in richness of insect species and may surpass them in detail of preservation.

The Ruby River valley is seventy miles from Yellowstone National Park in a basin of the Rocky Mountains formed by geological faulting. It is flanked by the Ruby and Gravelly Ranges. During most of Tertiary time, the entire valley was occupied by a lake in which a sequence of sediments was deposited. A vegetation much denser and more varied than that of today supplied leaves and other plant debris which were carried into the lake by numerous streams and buried in the mud. A high mineral content of the water and a possible absence of decay organisms provided favorable conditions for the preservation of organic remains, including insects which had been washed or blown into the lake.

Fossil sites exposed along the walls of dry washes consist of laminated, light-colored shale which separates along some of its bedding planes. Where such rock is exposed to annual subzero temperatures and to baking during the summer, it splits into progressively thinner slabs. These are the "books" of shale with their "pages," or layers, so thin that the slightest breeze will waft them into the air. It is this "paper shale" that contains the fossil compressions of most plants and insects at the Ruby sites.

It can rightfully be assumed that the large, varied Ruby River basin insect fauna was attuned to the equally varied angiospermous flora of trees, shrubs, and herbaceous plants, and that a dependent relationship exisited between these two groups. This image is recreated from fossils nearly fifty times as old as mankind itself, from plants and insects which left nothing but films of carbon—sharp, clear replicas of their former selves.

The Ruby fossil plant assemblage provides an eloquent basis for local divisions of vertical life or climatic zones, each with its adapted entomological fauna. Diagnostic criteria for fossil insect identification are sufficient to place them in their proper orders, families, subfamilies, tribes, and even genera. Their taxonomic status is therefore accurate except on the species level. The entomological sample of the Ruby shales probably represents but a small fraction of the genera and species which actually existed. Recognizable fossil insects thus indicate a reliable, if not a specific, correspondence with then-existing plant relationships and with plant-insect interdependence.

In the light of applied evolutionary principles, the botanical and entomological participants of the Ruby Flora give a glimpse into antiquity, allowing a sharp focus on present phenomena. The limited picture can only dimly suggest the meanderings of the evolutionary path, the immensity of geologic time involved, and the astronomical numbers of species and individuals which fell by the wayside as links between past and present.

AIR POLLUTANTS (Continued from page 96)

fluent from them would not equal that from cars.

Not only do the type of burning and the temperature achieved vary between cylinder ignitions and furnace fires, but the type of fuel also varies. Since coal and oil consist of larger and more stable molecules than gasoline, this condition might be reflected in the low-volume organic effluent from the former sources.

The phytotoxic air pollutants which we have considered have their genesis in fires occurring in cylinders, furnaces, or open burning. Since the needs for power and heat for an expanding population and economy will continue to increase, the problems created by air pollutants of the oxidant type promise to become more accute. With their effects on food plants, and eye-tearing and impaired visibility, the solution of this twentieth-century problem becomes imperative.

ITER AZORICUM

By Pierre Dansereau

Dr. Dansereau is Assistant Director (Botany) of The New York Botanical Garden.

(Continued from March-April, 1965)

640530.

The Cabo da Praia-Praia da Victoria area is probably the most extensive beach in the Azores. It shows all the typical features, including dune formation. The flora, however, is incredibly poor. There are patchy carpets of a velvety blue-leaved *Lotus creticus* with bright orange blossoms, and the pink clusters of *Polygonum maritimum,* and some weeds, lots of weeds. The endemic *Festuca petraea* does not amount to much: it does not seem to fulfill the usual role of the beach-grasses (*Ammophila, Elymus, Calamovilfa,* and such). Instead, *Arundo donax* is the dune stabilizer. Its tough rhizomes, which we painfully dig up, are hirsute with hungry fibrous roots. The tops of dunes have screens of feathery *Tamarix.* This area looks somewhat like *Cabo Frio* (Brazil), with cattle grazing even the dry sward of Bermuda-grass on the sand flats. A man and a woman walk by, preceding and following an ox cart.

Big José and I walk the whole length of Cabo da Praia, ending up at the derelict fort which rises from the rocky promontory. The castle-like shore holds small tidal pools, pale emerald splashes on the black lava crust. I strip to bathe in one of them but cannot convince José to join me. The incoming waves wash into my pool which is lined with papery white and green algae and full of tiny Crustaceans which do not bite very much. I revel for some time in its rhythm and then dry off on the smooth black lava. I guess this is not much of an Azorean sport. The very few bathers on the long beach are American soldiers. It is hardly a cold day; in fact, a hot one in spite of the torrential showers.

Lunch at the "Riviera," a nice little "guinguette" which serves delicious lobster with green wine. We take our time here. And then visit the town, a very old one, with a beautiful church and a white city-hall. One very large window has conspicuous iron bars. Rather neat-looking young men inside are chatting with friends lolling outside, I ask them:
— There are no really bad people on these islands. How can you possibly be in prison?
One of them smiles a big piano smile:
— Various crimes! he says.

640531.

Lazy morning of Sunday, with late risers well scrubbed, relaxed and shining faces. The sea breeze parts the muslin curtains of our tall French windows. The praça below has a flagpole in the centre of a star of black-and-white mosaic and on a bench a cluster of rooklike seminarians gaily chattering. A ship anchored in the harbour, unrocked. The great white walls of the rampart curling upwards to the high town; the dull red roofs quietly absorbing the golden light. Flowers in beds, and pots, on railings, in boxes: pink mesembryanthemum, yellow gazania and marigold, all singing.

640601.

This is a day almost too full. I seem to have run the whole gamut of my involvements: field contact with plants, discussion of ecological principles and land-use and social phenomena, response to many people as people (and not message-bearers), public performance.

We start out early for the Serra de Santa Barbara, determined, this time, that we shall reach deep into the *caldeira* to the Lagôa Negra.

Fagundes has sent his assistant, a handsome and lively young engenheiro agronomo, Antonio Carvão, who is a nephew of Colonel Agostinho. He is in charge of some of the pasture experiments and gives us excellent demonstrations of the results obtained at the Casa da Queimada de Baixo. These lush pastures are worthy of New Zealand, no less! The bagacina has been ploughed and leveled, although it tends to cave in and to resume an irregular microrelief. It is sown to *Lotus pedunculatus,* ladino clover, ryegrass, and orchard-grass. Also a variety of *Plantago lanceolata* (seed imported from Germany?) which I had never known except as a weed! The grasses are overwhelmingly dominant for three years; then diminish, and the legumes take over, especially if there has been overgrazing. Fertilizers restore vigour to grasses. The lustrous red cows are a crossbreed of Danish and old local stock.

We gain a good impression of what these fields were originally like in an adjacent plot, on a similar site where the microrelief has remained crusty and irregular and where *Calluna, Erica,* and *Pteridium* form a disorderly heath. Local plugs in the drainage even allow *Sphagnum* to accumulate.

As we penetrate into this "wild" territory and begin to climb the north slope of Santa Barbara, we are confronted again with the sudden breaks in the ground, the *algars* and the *grutas.* On the lip of one of these ravines, a flowering specimen of *Prunus lusitanica,* which we had not yet encountered. It is now extremely rare in the Azores. I had had my eye out for this shining evergreen cherry, so handsome a tree in the Canaries, and which I had hunted up in Portugal itself on a rainy January day in 1955, with Antonio! Here, it is a mere shrub. But its spray of blossoms has all the pride of cherries.

There is much evidence of rough pasturing all the way up this steep slope, from five hundred meters upwards. The damaged sites have more *Erica,* the better-consolidated scrub is more or less dominated by *Laurus.* Everywhere there is evidence of the selective destruction of cedar *(Juniperus brevifolia)* for the fabrication of *galochas* (sandals, called *tamancos* in Madeira where they are (or were!) also whittled out of juniper wood).

Above eight hundred and fifty meters, we begin to see some intact old junipers (up to 3.5 m. tall and with a diameter of 25-35 cm.) Their trunks are as twisted as barbershop poles, and their bark tends to tear off in ribbons. Although wind is indeed an important factor on these sea-

21. A view of the town of Angra do Heroismo (Terceira).

22. Fixation of dunes by *Arundo donax*. Network of rhizomes exposed by wind erosion. Praia da Victoria (Terceira).

23. Oxcart with full wheels and osier basket. Praia da Victoria (Terceira).

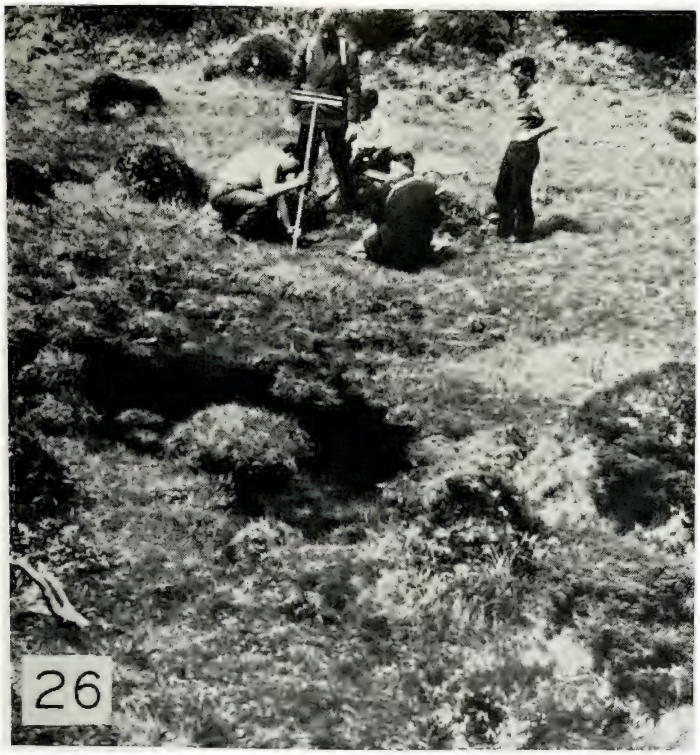
24. A cedar trunk *(Juniperus brevifolia)* hewed down. Antonio Carvão displays partly shaped sandal whittled out of cedar wood.

25. Mound-formation in the peat bog, Serra de Santa Barbara (Terceira).

facing hills, this corkscrew habit could very well be inherited as in our own "cedars" (*Thuja* and *Chamaecyparis*).

We cross a ridge at about nine hundred meters and come down into a circular, cuplike depression, in the centre of which is a pond which we call "Lagôa Agostinho" in honour of our patron, the Colonel. Here the juniper scrub looks as though it had never been tampered with at all. Whereas there is some admixture of laurel near the rim of the depression, and the edge of the pond is lined with *Eleocharis* and an isolated holly clutches a protruding rock, the rest of the gently sloping land is covered with one of the most reduced (and probably most stable) plant communities I have ever seen. The uppermost layer (1-2.5 m.) has a coverage of about sixty per cent and consists exclusively of *Juniperus brevifolia* (with a few clumps of the golden parasitic *Arceuthobium oxycedri*); the next layer (35 cm. to 1 m.) is also quite lush (forty per cent coverage) with the big, spreading fern *Culcita macrocarpa.* The rest is *Sphagnum* in big cushions which occupy twenty per cent of the area between ten and thirty-five centimeters, and extends as an unbroken carpet below ten centimeters. There is constant seepage below the moss polster, due to slope, and therefore no peat accumulation. The junipers and the fern have access to mineral soil through the moss buffer which apparently keeps the holly and even the laurel out.

We have our lunch, sitting on the conveniently recumbent trunks of the cedars, our feet on the resilient moss cushions. Sun and mist play on the water mirror, now blue, now black, wrapping and piercing the golden-green fronds.



26. Boring the bog for peat samples. Serra de Santa Barbara (Terceira).

27. Bento Rainha, on the soliflucted slopes of Rocha da Chama (Terceira).

28. The vast expanse of unbroken laurel-juniper scrub in the Biscoito da Ferraria. On the left, the Rocha do Narião (Terceira).

How good is the São Jorge cheese, the crisp azorean bread, and the chunks of bonito-fish. Dreams of ecosystems obliterate the literary impersonations of my youth, when I could think of nothing more exciting than to have applauded the young Victor Hugo on the night of "Hernani," or maybe to have stood up for Pasteur or for Dreyfus! But now, I ask myself: "Are you a man of megalopolis, and supermarkets and television and graduate schools and faculty seminars and gracious weekends in the country?" And I breathe a breath of highland air and I eat the fish and bread and cheese of the Azores and I seem to plunge headfirst, like an arrow, into one of Odum's energy flow diagrams and to cycle around and around, being very much a part of the Azorean landscape.

The Lagôa Negra is our destination: it forms the bottom of the caldeira of Santa Barbara. We walk through long corridors between the irregular contours of the highland. Parts of these valleys have a flat floor, with drainage congested enough for peat-formation. There is also some evidence of frost-heave, and mounds of various sizes have arisen, similar to those we saw in the Terra Brava area. Antonio and Bento with the help of big José and the young men take a peat sample. At a depth of one meter they strike pure *bagacina.* The progression of vegetation seems to go from a somewhat soupy *Sphagnum-Eleocharis* cover, where open water has persisted, to blanketing, flat *Sphagnum,* to mound-formation (which involves more *Polytrichum* than *Sphagnum*) and permits *Agrostis, Festuca,* and *Luzula* to develop and finally, where the mound is large and high enough: *Juniperus.*

The sheer cliffs above us bulge with big *Sphagnum* cushions and are hung with great tufts of extremely long-leaved grasses, and studded with rosettes of stiff-leaved *Tolpis,* an almost banana-leaved *Rumex,* and large-leaved succulent buttercups which flash their gold sprays of flowers in the mist.

The Lagôa Negra itself is rather disappointing: it is a steep, inverted cone entirely invested with grassy tussocks on its soliflucted sides. And way down below, the dull black eye of a shallow pond. On its edge, we sight dimly the culprits: some very lonely-looking cows. I am content with a glance from above at this promised land desecrated. John jumps around from clump to clump just below the rim of the caldeira and gets some additional notes on the state of this supposedly inaccessible spot.

But we must turn back, for it is mid-afternoon and I am scheduled to lecture tonight. We plod through alternating mist and sun, stones rolling and moss foundering underfoot. It is rather interesting to witness the flow, by erosion of cliffs and pathways, of pink sand and gravel which spreads in sheets over the boggy expanses of the valley floors, forcing inorganic matter into the peat. This situation reminds me of the Central Baffin bogs with their yearly increment of windblown silt!

The sun still high over Angra's white walls and dull red rooftops and slanting through the pines of Monte Brasil. We have an excellent dinner of fish and vegetables and nice, green, white wine, which boost me back to the pitch I must maintain tonight.

The *salão nobre* is an impressive room, hung in scarlet damask, bearing the portraits of statesmen and heroes. The

29. John Milton in the laurel-juniper scrub of the Biscoito da Ferraria. In the background the portion of Rocha do Narião that was burned twelve to fifteen years ago (Terceira).

ceiling is an admirable work of marquetry. John and Antonio and I set up some coloured charts which I have drawn for the occasion, tacking them with magic-tape to a large blackboard. They contrast the vegetation of non-oceanic islands like Baffin, Montreal, Great Britain, Puerto Rico with Hawaii, New Caledonia, New Zealand, the Canaries, and the Azores. I am to speak on "O clima, a terra, a vegetação e o homem no meio insular" ("Climate, land, vegetation and man in the island environment"). Now, with two weeks of Portuguese down my throat, I am fairly confident that what I have to say will come out. But, as I see the gentlemen file in, the governor, the president of the junta, the leading professionals and businessmen, my knees wobble a little. And presently Dom José Vieira Alvernaz, late patriarch of the Indies, is led to a sculptured high chair very close to me: he looks like El Greco's Saint Jerome, although more benign. I am told he was born on Pico and now, after Portugal's forced withdrawal from India, has retired to Angra, where he carries on some experimental work in animal psychology. Saint Jerome, they say, was not all that easy to get along with . . .

Colonel José Agostinho presently steps up and introduces me to the audience. This wordly man who commands so many cultures is able to equate British understatement and Latin overstatement and to blend them with much elegance. So shifting my gaze from the noble faces of the archbishop to the stern outlook of the Colonel and the sweet, if anxious, stare of Quitéria and Françoise, I launch into my speech.

640602.

It felt good, last night, to walk back through the wet and sonorous streets of Angra, alone with Françoise. I was happy that I could repay in a very small way the unfailing kindness with which we have been surrounded here. The ritual which is dear to this society is actually very congenial to me. It is not mere bourgeois behaviour of dress and address; it has grace and honour and warmth. It rewards the imagination and enhances friendship, if you are fortunate enough to play the theme with a small variation of your own. This I tried to do by involving the various qualities that give meaning to my mission: my allegiance to Latin culture, my love of the Portuguese language, my affinity with American science and institutions (The New York Botanical Garden and the Conservation Foundation), and my assumption that Azoreans wish to hear about world problems. Finally, the hope that Antonio, Quitéria, John, and I will come out, some day, with something of value for them.

This afternoon is spent in the field with Colonel Agostinho. He leads us on a grand cross-island tour and we halt in all the appropriate places to view the various lava flows. He recognizes eight different periods: the most recent is 1761, but the others are not so precisely dated. Thus the caldeira de Cinco Picos is the most ancient, as witness the breakdown of its rim and the overlying flows. John and I take pictures from the vantage points chosen by the Colonel.

The evening is most delightfully spent at the home of our friends the Magalhaẽs. It is a large apartment, full of family souvenirs, similar to many houses visited in our childhood and to which we return with pleasure. Victor Magalhaẽs' mother is quite the Roman matron in her beauty and dignity, and yet a woman of our time in her humour and involvement in the affairs of this generation. The food is, of course, in the best Portuguese tradition. Dona Eugenia and her cousin, unostentatiously stylish, have an added grace in this décor. The woodwork, the ivories. the pictures are all meaningful.

640603.

Our last day on this beloved island, and we are determined to make it count. We shall visit the great, undisturbed laurel scrub of the Biscoito da Ferraria, which I had briefly seen with Fagundes in 1960. We have all day. Our ship, the Ponta Delgada, sails at eleven p.m.

Although we start out from Angra, wih Antonio Carvão, in bright sunlight, we hit the nevoeiro at three hundred meters. We pick up big José and some wet shepherds and wetter dogs, and get into a jeep and wind our way upwards to Rocha da Chama, where we leave the vehicles in the lee of an old lava-rock house encrusted with bright orange lichens.

This landscape begins to make sense to me. At Rocha da Chama, old lava and bagacina, well comminuted, fairly deep, long stripped of original scrub, maybe ploughed in spite of slope, sown to grasses and legumes, pastured. Now the prey of solifluction, probably much aggravated by frost heave. It can be seen in many places how the sod has poured over a protruding rock, been rent and split and recolonized on its edges by mosses which tend everywhere to heal these breaches. However, there are virtually no woody invaders anywhere in these tumultuous pastures: seedlings of *Vac-*

cinium do not look vigourous.

As the fog tends to lift under a wind which flaps our nylon capes violently against us, we reach the end of the pastures and the edge of a great trachyite wall which draws a semicircle around the Biscoito da Ferraria, revealed as a seemingly flat and very uniform expanse of almost unbroken scrub. We lie on our bellies, on the grassy ledge, and look down on this miraculously virgin stand. Then we scamper down the narrow path, leaning against the wind which abruptly is shut off as though a door had closed and we practically fall onto the lower trail.

The Biscoito is anything but flat, consisting of ridges and mounds, and its microrelief is quite similar to the Terra Brava pattern. I make sketches again of this great moraine-like jumble of rock, so variously weathered and vested with vegetation. A typical stand has thirty species on a 10 × 20 meter area. It consists of four well-marked layers. In the canopy, five of the Islands' most important woody plants: *Erica azorica* and *Juniperus brevifolia* (which are dominant), and *Laurus azorica, Ilex perado* var. *azorica, Notelaea azorica;* two more, *Rhamnus latifolia* and *Vaccinium cylindraceum,* as well as *Calluna vulgaris* (which is very abundant) are present in the second layer; in the third layer down, *Myrsine africana* var. *retusa* is very abundant, with bracken *(Pteridium aquilinum)* and woodrush *(Luzula purpureo-coerulea)* and loose-strife (*Lysimachia nemorum* var. *azorica*). Several ferns are conspicuous as rooted herbs or as epiphytes; but lichens and especially mosses (very little *Sphagnum*!) form most of the carpeting. Some of them also serve as epiphytes, as does the filmy fern (*Hymenophyllum* sp.). This is a complex ecosystem with its intricately rooted shrubs, surface-scouring herbs, facultative epiphytes, and overwhelming mosses. What is the mineral nutrition of this biomass?

One gets quite a shock, looking up at the neighbouring Rocha do Narião, which has some of these same big shrubs clinging to fissures. Of course, on the cliffs, there are also great big hanging tufts of long-leaved grass which simply do not occur down here on the *biscoito.* We are told that twelve to fifteen years ago, during a dry summer, fire was set to the grass and that the part of the cliff which is now nearly bare, until then had harboured cedars up to five meters long. The whole vegetation of the cliff, apparently, had then come tumbling down, as it does from sheer top-heaviness and water-logging in the fiords of New Zealand. (Speaking of which: the New Zealand flax, *Phormium tenax,* is right there, in the cracks of these cliffs, a weed!)

After wandering through the Biscoito da Ferraria, we crossed a ridge and followed valley floors, encountering, at Criação da Rocha a small pond with a nice zonation. From the centre: *Potamogeton natans, Scirpus fluitans, Eleocharis* (a viviparous form), *Callitriche stagnalis, Polygonum* sp., *Carex* sp., *Juncus effusus.*

Towards the end of the day, more than a bit weary and cold, we came to the Furnas do Enxofre. The soil much spoiled and blanched where the sulfurous fumes have emerged and the charged waters splattered. *Lycopodium cernuum* present (as in New Zealand!). John and I first tested the issuing fumes with our hands and put our faces in the vent. We decided it was safe to strip and take a steam bath, which we did, to the great amusement of José who has no such adventurous urges. It was very soothing and bracing and horribly messy as we got back into our clothes with some remnants of sulfur and mud on our skins. But we felt very much lighter in the final march to the waiting jeeps.

And now, there is the Ponta Delgada, anchored in the middle of the harbour of Angra do Heroismo, and presently we shall be off to Faial.

ATLAS OF NORTH AMERICAN ASTRAGALUS

A Review

By Richard S. Cowan

Dr. Cowan is Assistant Director of the Museum of Natural History, Smithsonian Institution, Washington, D. C.

Taxpaying systematists may well rejoice at the good use to which National Science Foundation funds have been put in the publication of this monumental work. It is also a tribute to the tenacity and botanical devotion of its author who has literally lived this difficult genus for the past twenty years. All those who have struggled, with varying degree of success, to identify species of milk-vetch, will discover herein perhaps the first completely critical treatment, in spite of the fact that the genus has received very considerable attention by past authors.

Perhaps the best thing a reviewer can say about a taxonomic study is that the keys work, for without this assurance there is scarcely any valid reason for its publication. And these keys do work! Because of the number of specific and subspecific taxa involved (552) and the rather restricted range of a large majority of them, the author provided eleven keys for as many geographic regions from Alaska to Central America. This is certainly a useful device but for the ordinary herbarium worker unacquainted with the counties of Utah, for example, which includes parts of two regions, the system proves a hardship. However, the alternative of a single key to all 368 species might prove an even more formidable handicap. Superficially, one might conclude that keys could have been made for each of the seven groups of sections called "Phalanxes" by Barneby; however, he considers these designations to be primarily of utilitarian significance, without nomenclatural or evolutionary implications for the most part. Most of the geographic range covered by the monograph is shown on a map facing the first page of keys with nine of the eleven regions outlined. The geographically well-informed user, or a less well-informed one with an atlas at hand, can easily determine which key is appropriate for the collection in question and proceed to its identification without great difficulty. Although the keys are of the indented type with numbered contrasting statements, the author has taken the additional precaution of indicating the routing through the key by means of parenthetical numbers at the end of statements which do not end with the

name of a taxon of some rank. Most of the key characters are very obvious ones, with the possible exception of his use of duration of the plant body as a primary characteristic; even this is often sufficiently obvious either in the field or in the herbarium. Whether the hairs of the frequently dense pubescence are basifixed or dolabriform (malpighiaceous) might appear to be a difficult primary breakdown in the key. However, the author points out in the introduction that it is unnecessary to use a microscope for determining the hair-type because of a simple rule-of-thumb test, which certainly works with the moderately to densely hairy kinds. If a leaflet is broken transversely in two halves, the broken edge of the bottom half only will appear ciliate when the pubescence consists of basifixed hairs; the broken edge of both halves appears ciliate when the hairs are dolabriform. Moreover, under low-power magnification, the two types of hairs behave differently when touched with a dissecting needle. Such intimate details are never even suspected, much less presented, by the hasty, the superficial, or, in many instances, by those who are principally concerned with providing an evolutionary system. This is only one example of Barneby's overwhelming objective to produce something which will be useful to others, and at the same time phylogenetically sound.

The introduction begins with an account of the history of the genus, from Dioscorides to Rydberg, written in a style which is at the same time delightful reading and precisely informative. Barneby's evaluations of the contributions and philosophy of M. E. Jones and Per Rydberg are thoroughly enjoyable and perceptive to an extent well beyond the ordinary taxonomic writer. Even when he writes of the morphology, cytology, and phylogeny in the introductory parts which follow, it is with an affectionate intimacy of knowledge based in much field observation and herbarium study. The introduction concludes with "A New System for North American Astragalus," consisting of a statement of the basic phylogenetic assumptions on which the monograph rests and a semidiagrammatic synopsis of the genus, including the 368 species arranged in ninety-three sections, twenty-eight series, and seven phalanxes.

The individual species descriptions appear to be complete, revealing much painstaking attention to the most minute details; although the account of the morphologic features is run together in one long paragraph, the description is easy to use because the first word of each of the clauses is italicized. This device permits the user to quickly compare, for example, the petal of two related species in their respective descriptions. The paragraph of description ends with the citation of representative collections and an indication of the total number used in preparing the description, as well as the number actually studied and collected in the field. Then follows a statement of geographic and ecologic range, reference to the pertinent text-map, and the time of flowering. The treatment of a species ends with the synonomy, type statement, and a general discussion of the taxon, all set in eight-point type. Although having the synonomy in this position, rather than at the beginning of the species treatment is unusual, it does permit close association of synonyms with citation of the nomenclatural type collections.

The maps are restricted to depicting the range of one to four taxa, never more, for a very good reason. The only symbol used on all 163 maps is a solid triangle, the apex of which is oriented north, south, east, or west, each direction indicating the geography of a different taxon. The legends for four taxa list the names, each with an arrow indicating the direction of the triangle representing the range of the taxon. Perhaps because it is unconventional, this innovation confuses me more than would four, very different symbols, but this may be only an individual reaction.

At the risk of being marked as a poor reviewer, I have to report total satisfaction with a difficult task, exceptionally well done. A small thing, like an occasional typographic error, should be overlooked, and my own confusion with the map-symbols may be disregarded in the face of such excellence. This is a work which properly belongs in every North American botanical library where it will long serve both as a guide through the intricacies of *Astragalus* and a model for future systematic presentations.

ATLAS OF NORTH AMERICAN ASTRAGAL US. Barneby, Rupert C., 1188 pages, i—iii, 163 maps. Memoirs of The New York Botanical Garden, Vol. 13, pt. 1 and 2. 1964. Cloth $35, paper $30.

MOSS AS A CULTURE MEDIUM (Continued from page 106)

the genus *Paphiopedilum* mentioned above. Even plants which had been growing in the moss for three years, and quite broken down, still had active old roots producing new lateral rootlets.

The genera in this experiment are: *Acineta, Aspasia, Brassia, Bifrenaria, Cattleya, Catasetum, Coryanthes, Dendrobium, Epidendrum, Gongora, Lycaste, Laelia, Masdevallia, Oncidium, Odontoglossum, Pleurothallis, Paphiopedilum, Stanhopea,* and *Trichopilia.* While some of these have done better than others, this has, I believe, little to do with the potting material used. However, the cattleyas and oncidiums, the two genera most widely tried in the experiment, seem to do exceptionally well.

I like these two species of moss mostly for their texture. Unlike the sphagnums and so many other mosses, they do not collapse and become soggy after a few months, but retain their spongelike texture for two or more years. This is an important factor for proper drainage and aeration. The two species are very much alike in general appearance, the main difference being that *Thuidium delicatulum* has a lacelike or fernlike appearance, hence its name "fern-moss," whereas *Hypnum imponens* has a more compact habit.

Since I started to use these mosses as potting medium, I find that I can pot backbulbs and divisions with a minimum of living roots directly into it. If they are then syringed frequently, they establish themselves rather quickly. Because of the vast surface area created by the moss, the roots are in solid contact with the medium all the time, thus being able to absorb and function more efficiently.

More work must be done with these two species of moss and further testing with a greater variety of orchids, before we can be certain that they will be satisfactory as culture medium on a wide scale. Nevertheless, I am sufficiently satisfied after three years of observation so that I would not hesitate to pot my best cattleya or oncidium in it.

COMING EVENTS

at

THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500.)

NATURE WALKS, starting from the Museum Building on Saturdays, 1:30 p.m., continue through June 26, 1965.

"FOSSILS ARE FUN," illustrated Saturday Afternoon Lecture by Dr. Herman F. Becker, on May 8, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

FIELD BOTANY (Cryptogams). Eight weekly sessions, starting May 10, 1965. See Educational Program for dates and hours. Instructors—Eleanor Yarrow and Elizabeth C. Hall.

"GARDENS OF IRELAND," illustrated Saturday Afternoon Lecture by Dorothy Lea McFadden, on May 15, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"GOING DOWN MEXICO WAY," illustrated Saturday Afternoon Lecture by Hertha A. Benjamin, on May 22, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

GRADUATION RECEPTION for students of the Two-Year Courses in Botany, Practical Gardening, and Landscape Gardening, on June 15, 1965, 8 p.m., Auditorium of the Museum Building.

Admission to Saturday Afternoon Lectures, 25 cents; free to members of the Garden (upon presentation of membership card).

Nature Walks, fee $1.00 per person.

For fees of the various courses, see the Educational Program.

MAY-FLOWERING—azaleas, lilacs, dogwood, wistaria, viburnums, hawthorns, rhododendrons, mountain-laurel, tulips, early peonies, irises; also alpine and rock garden plants in the Thompson Memorial Rock Garden and wild flowers in the Native Plant Garden.

JUNE-FLOWERING—roses, peonies, lilies, tropical water-lilies, hydrangeas, mountain-laurel, tuliptree, Japanese dogwood, mock-orange, stewartia; also rock garden and alpine plants in the Thompson Memorial Rock Garden and wild flowers in the Native Plant Garden.

FRIENDLIEST GREETINGS

To

THE AMERICAN RHODODENDRON SOCIETY

The New York Botanical Garden will welcome members of the Society either before or after their annual meeting at Planting Fields.

Pictured here are some of the rhododendron and azalea plantings at the Garden.

NEWS, NOTES and COMMENTS

Available for Employment. In June, 1965, a group of young gardeners between the ages of eighteen and nineteen will graduate with high school diplomas from a course of practical training in horticulture operated by The New York Botanical Garden and Christopher Columbus High School, under the Municipal Cooperative Education Program of the Board of Education of the City of New York.

This program, which began in September, 1963, provides for well-motivated students to spend alternate weeks of the entire year working as apprentices or trainees at the Botanical Garden and alternate weeks, during the school year, at high school studies. The studies are related to and coordinated with their practical work at the Garden. Almost all the trainees worked full-time throughout the school vacation (summer 1964) at the Botanical Garden and thus gained even more practical experience than the plan provides for.

Their work at the Garden has been extremely practical, for the trainees carry out all the regular tasks of a gardener immediately with and under the direction of the gardeners and foremen-gardeners of the Botanical Garden. During the two years each trainee spends approximately equal periods of time in the Arboretum Department, Flower Garden Department, and Greenhouse Departments.

Their gardening work is under the general supervision of Louis P. Politi, Horticulturist, and under the overall direction of T. H. Everett, Assistant Director (Horticulture). Both Mr. Everett and Mr. Politi are convinced that the young men who will be graduated from this course understand the discipline of working for a living and have a good grasp of the basic techniques of practical horticulture. The use of tools, implements, and machinery in gardens has been stressed.

These young men are now seeking permanent employment in gardening, nursery, and allied work where there will be opportunity for advancement. Anyone interested in securing the services of one or more of these young men should communicate with Mr. Everett, Assistant Director (Horticulture), The New York Botanical Garden.

Garden Club of America Symposium at the Garden. Under the auspices of the Native Plant Garden Committee of The New York Botanical Garden, a Garden Club of America Symposium was held at the Garden on April 28, 1965. Mrs. Thomas S. Gates, Jr., was Symposium Chairman.

Those attending the symposium assembled at the Native Plant Garden at eleven o'clock and were conducted on a tour by members of the Native Plant Garden Committee and by staff members of the Botanical Garden. The tour included the new wild flower area with its unique mist system and the Thompson Memorial Rock Garden.

At the luncheon held in the Snuff Mill, Dr. William C. Steere gave a short talk. The day's program concluded with a trip around the grounds in the "Floral Flyer."

New Editor for The Botanical Review. Dr. Pierre Dansereau, Assistant Director (Botany), has succeeded Dr. Edmund H. Fulling as editor of *The Botanical Review*, which was founded in 1935 by Dr. Henry Allan Gleason, Head Curator Emeritus of The New York Botanical Garden, and by Dr. Fulling, Honorary Curator. Since 1962 it has been published by the Garden.

In discussing his aims for the quarterly, Dr. Dansereau said, "Those who write for *The Botanical Review* will be as free as they have always been in matters of opinion and style. It goes without saying that they can be chosen only among those who have mastered their field . . But I venture to formulate the wish that more relief be given to the human dimension, by underlining significant personal and social developments which have affected the direction of inquiry and the interpretation of results in botany. The breakdown, in our time, of many social and moral taboos, of many racial and economic barriers, of many political and religious isolations; the outbreaks of war, revolutions, and space travel; the revelations of hidden mineral, biological, and psychological codes have given us much more freedom than we have strength enough to use.

"This paradox has long been known to teachers (and, who knows? to parents as well!). Socrates must not decide, but the student himself who has enough self-knowledge to make a wise move or a profitable mistake!

"Botanists must learn more about plants and more about botany. But maybe none of this is any good unless they learn more about themselves.

"I venture to quote what I recently had to say concerning Père Teilhard de Chardin, who so boldly made the whole of his experience bear upon his scientific interests that his motivation clearly sustained his investigation:

" 'This is the language of a modern man, as remote in the way he expresses himself from Pascal and Descartes as Picasso is from Poussin, as Frank Lloyd Wright is from Le Nôtre. Far from taking pride in hiding the seams and the infrastructure of a definitive work, the contemporary sensibility is more fully gratified if traces of the living elaboration can still be detected to indicate the movement of creation. Teilhard conveys his hard-won ideas about spirit and matter by also revealing as much as he can of the apprehensions and habits which put him in the state of mind (indeed of the grace of mind-and-body) that made them possible. He does not go along with most contemporary (and reactionary?) scientists who so carefully strip their publicly-revealed work from its sources of inspiration and motivation. Certainly this prevailing attitude among practicing scientists is one of the main reasons for the breakdown of communication between science and the humanities which C. P. Snow (1960, 1963) has characterized as the alienation of the two cultures. In doing this, the scientists have restricted their range as well as their audience.'

"Botany is a wonderful proving-ground. Let us hope that, in the years to come, we shall be successful in providing exhaustive descriptions of the plant world, ever-renewed interpretations of plant life, and moving statements of our own wrestling with their mysteries."

Within the past several months, Dr. Dansereau participated in a panel on environmental biology at the Smithsonian Institution in Washington, D. C., gave the Sigma XI lecture and seminar at Smith College, Northampton, Massachusetts; and attended a conference on pollution at the National Academy of Science—National Research Council, Washington, D. C. From January through May, 1965, he has been participating in the Columbia University faculty seminar on ecological systems and cultural evolution; and from February through May, 1965, he has been giving a course on "Vegetation of the World" for Columbia University students.

Activities of the Director and Staff. Dr. William C. Steere, Director, returned early in March from a month's visit in Antarctica where he was engaged in field work in the McMurdo Sound area. (An account of his trip will appear in an early issue of *The Garden Journal.*) On his return from Antarctica Dr. Steere stopped off at Pomona College in Claremont, California, to address a student assembly on his research work at the opposite end of the globe —the title of his lecture, "Botanical Research in the Arctic." He attended the Institute for Humanistic Studies, devoted to public understanding of the role of science in society, which was held in Aspen, Colorado, on March 14-19. Dr. Steere participated in the Ninth Annual Conference of Directors of Systematic Collections

At the House Plant Show in the Conservatory of The New York Botanical Garden during late winter—early spring, 1965.

at Ann Arbor, Michigan, on April 16 and 17, and on April 23 chaired the annual meeting of the Trustees of Biological Abstracts in Philadelphia.

Dr. William J. Robbins, Director Emeritus, was one of the speakers at the formal opening of the Laboratory of Plant Morphogenesis, Department of Biology, Manhattan College, New York, on February 6, 1965. His subject: "Topophysis and Morphogenesis." Dr. Kenneth Thimann, Professor of Biology and President of the American Institute of Biological Sciences, addressed the gathering on "The Role of Botanical Sciences in Biology."

Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research, attended the annual meeting of the Council of the Association for Tropical Biology, Inc., in Caracas, Venezuela. He serves presently as president of the Association. Within recent weeks Dr. Maguire visited Dr. Boris A. Kurkoff at the latter's extensive coffee plantation in Guatemala. During the four-day visit preliminary plans were laid for a series of systematic plant explorations in Guatemala. More recently Dr. Maguire attended two conferences in Washington, D. C., on behalf of the Association for Tropical Biology and the Organization for Flora Neotropica, of which he is Executive Director. At Harvard University he gave a seminar to staff and graduate students in biology.

Dr. David J. Rogers and George Estabrook presented a seminar on taximetric methods at the University of Massachusetts, Department of Botany and Zoology, on March 3, 1965. On March 11 the entire Department of Quantitative Taxonomy — Dr. Rogers, Dr. Michael Wirth, Dr. Robert Jancey, Henry Fleming, and Mr. Estabrook — presented a panel discussion on the dynamics of taxonomy, including the use of computers as tools, at Yale University, Department of Botany. On April 8, Dr. Rogers presented a seminar at the University of Toronto, Department of Botany, and on May 18 the full department will present a panel discussion at Queens College, Department of Biology, in Flushing, New York. All these seminars deal with the procedures and methodology for mathematical studies of systematic botany, as well as the application of computers to botanical problems.

Dr. Herman F. Becker, Research Associate, reports that on February 8 and 9, 1965, the Bronx River was flooded several feet above its banks, and when it receded it left deep pools near the trail. He rescued with a butterfly net nineteen large carp (about thirty-five pounds) twenty small carp, and one goldfish, returning them to the river.

Dr. Becker gave an illustrated lecture on "Fossils Can Be Fun" before the Hortus Club of New York on February 16. He visited the United States Geological Survey and The Smithsonian Institution in Washington, D. C., in February, to study the fossil collections pertinent to the Ruby, Grant, and Horse Prairie Floras of southwestern Montana. In March he paid a second visit to these institutions for a similar purpose, and discussed fossils, a manuscript, and other paleobotanical matters of mutual interest with Dr. Harry D. MacGinitie, author of the *Florissant Flora.*

A new topographic map under the title of "Mitzel Ranch Quadrangle, Montana," was published in February, 1965, by the United States Geological Survey. On the basis of Dr. Becker's collections, publications, and discussions with the Survey group, the Ruby fossil-plant area in Montana has been officially designated on the map as Fossil Basin.

Dr. Caroline K. Allen, Research Associate, spent the last two weeks of February, 1965, in the herbarium of the Arnold Arboretum at Cambridge, Massachusetts, in the interests of the *Lauraceae.*

Dr. Harold W. Rickett, Senior Curator of Botany, spent fourteen days in March in England, mostly in Ipswich in consultation with W. S. Cowell Ltd. on the Wild Flower Books and in London, at the British Museum, in conference with Robert Ross, Secretary of the General Committee on Nomenclature. Then Dr. Rickett, who is Chairman of the General Committee on Nomenclature, spent three days in Utrecht, The Netherlands, conferring with Dr. F. A. Stafleu, Rapporteur-Général.

Dr. Arthur Cronquist, Curator, is collecting this month in southern Utah in connection with the Intermontane Flora. He will spend August at the botanic garden in Leningrad, U.S.S.R., for botanical study and consultation in depth with Dr. Armen Takhtajan, a member of its staff. From mid-September until late November, Dr. Cronquist will collect *Compositae* in Mexico.

Walter Singer, Staff Photographer, was quoted and photographed in an article, "Shooting at the Flower Show," by Margaret R. Weiss in *Flower and Garden,* March, 1965.

Mr. Singer, Phil Clark, Assistant to the Director (Public Relations), Robert Breach, Curator of Publications, and Dorothy Ebel Hansell, Editor of *The Garden Journal,* attended the meeting and dinner of the Garden Writers' Association of America held at the Coliseum, New York, during the week of the International Flower Show. Mrs. Hansell also attended the spring meeting of The Holly Society of America in Norfolk, Virginia, on April 8 and 9 and visited The Norfolk Botanic Garden; and will attend the annual meeting of The American Rhododendron Society to be held at Planting Fields, Oyster Bay, Long Island, on May 21-23.

Mary Fleming, Technical Assistant in the Cryptogamic Herbarium, lectured on "Planting the Rock Garden" before the Garden Club of Closter in the Public Library at Closter, New Jersey.

Oswaldo and Maria Eneyda Pacheco Kauffmann Fidalgo are spending a year in the Cryptogamic Herbarium of The New York Botanical Garden in research on wood-destroying fungi, members of the *Polyporaceae.* Dr. and Mrs. Fidalgo hold separate fellowships from the Guggenheim Foundation and travel grants from the Fulbright Commission.

Dr. Fidalgo, who is Chief Biologist of the Cryptogamic Section of the Instituto de Botánico of São Paulo, Argentina, received his Batchelor of Science degree from the School of Philosophy, University of Brazil, and his doctorate from the School of Agriculture, University of São Paulo. Mrs. Fidalgo, who is a pharmaceutical chemist, received her Batchelor of Science degree from the National School of Pharmacy, University of Brazil, Rio de Janeiro, and is completing studies for her doctorate.

Eva Konrad Hawkins, who received her doctorate in botany from the University of Pennsylvania in 1961, will be associated for the next two years with Dr. Richard M. Klein, Alfred H. Caspary Curator, under a grant from the National Institutes of Health. Dr. Hawkins, who was born in Hungary and who received a diploma in biology and chemistry from the University of Science, Budapest, in 1952, became an American citizen in 1963. From September, 1961-January, 1965, she was Assistant Professor of Biology at the University of Delaware.

Flora Neotropica. A third international meeting sponsored by UNESCO was held in São Paulo, Brazil, December 14-18, 1964, for the purpose of establishing a Commission to initiate and carry out a program for a Flora of the New World Tropics. Representatives from Argentina, Brazil, Peru, Mexico, The Netherlands, the United Kingdom, and the United States served as delegates. Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research, represented The New York Botanical Garden.

Guests on February 27, 1965, on the weekly "Around Your Home and Garden" show, conducted by Ruth Alampi over WNBC Radio, were, left to right, Paul Van Wegen, President of the Stony Brook-Millstone (New Jersey) Watershed Association; Dr. P. P. Pirone, Senior Plant Pathologist of The New York Botanical Garden; and Allen H. Seed, Jr., Executive Vice President of Keep America Beautiful, Inc. Dr. Pirone discussed the effects of air pollutants on trees in New York City.

The Organization for Flora Neotropica was constituted by this Commission. It is to be a corporate body with legal address at The New York Botanical Garden. The initial panel of officers is: Dr. Alcides R. Teixeira, Instituto de Botanica, São Paulo, President; Dr. Joseph Lanjouw, State University of Utrecht, The Netherlands, Vice President; Dr. Efraim Hernández Xolocotzi, Escuela Nacional de Agricultura de Chapingo, Mexico, Secretary; Dr. F. Raymond Fosberg, Pacific Vegetation Project, National Research Council, Washington, D. C., Treasurer; Dr. Maguire, Executive Director; Dr. José Cuatrecasas, Smithsonian Institution, Washington, D. C., Scientific Director; and Dr. Rolf Singer, Universidad de Buenos Aires, Argentina, Scientific Director.

The governing Executive Board consists of Dr. Cuatrecasas; Dr. Ramón Ferreyra, San Marcos University, Lima, Peru; Dr. Fosberg; Dr. Angel L. Cabrera, Universidad Nacional de La Plata, Argentina; Dr. Xolocotzi; Dr. Maguire; Dr. Lanjouw; and Sir George Taylor, Royal Botanic Gardens, Kew, England.

As one of the host institutions, The New York Botanical Garden becomes the base of operations for planning and executing field work and herbarium research. The University of Buenos Aires and the Smithsonian Institution will become similar centers. Facilities of all major botanical research institutions will be employed in this program.

The primary object of the Organization for Flora Neotropica (O.F.N.) will be to prepare and publish floras in monograph form for all the plants of the Western Hemisphere Tropics. A measure of the magnitude of this long-term undertaking is indicated by the enormity of the tropical floras involved. Monographs will be prepared for a flora in which the flowering plants, largely trees, comprise an estimated one hundred thousand species. Of non-vascular plants, mosses, lichens, fungi, algae, an additional one hundred thousand species will be represented. An undertaking of this scope will require that many botanists engage in extended field work and intensive library and herbarium research over a period of years. Indeed, it is envisioned that the completion of such a Flora Neotropica will require the coordinated efforts of the world's leading institutions and the work of generations of their staffs.

At The New York Botanical Garden, preparations are being made to house for an indefinite period a staff of some eight or more specialists drawn from other parts of the world. These specialists will augment the already large in-house staff of the Garden which, as a part of its long-range program, has been engaged over many years—indeed from the time of its inception—in the exploration of and study of the floras of the New World Tropics.

BASSETT MAGUIRE

Seminars for Staff and Students. On March 4, 1965, Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research, showed his film on the Akawaio Indians of British Guiana; after the showing it was sent to England to be deposited in the Pitts River Museum. The following Thursday, Dr. Alma Barksdale, Senior Research Associate, spoke on "Sexual Reproduction in a Water Mold called *Achyla*."

On April 8, 1965, Brother Alain Liogier, Honorary Curator of West Indian Botany, gave an illustrated lecture on "Phytogeographical and Ecological Studies in Cuba."

Visitors to the Garden.

Henry O. Hespenheide III, Biology Department, University of Pennsylvania, Philadelphia.

Dr. David E. Fairbrothers, Elaine M. Norman, Charles B. Redington, and Charles Uuo, Department of Botany, Rutgers The State University, New Brunswick, N. J.

William Ronaleg, C.S.I.R.O., Brisbane, Australia.

Dr. Robert Kral, Louisiana Polytechnic Institute, Rouston, La.

Dr. William L. Stern, Department of Botany, Smithsonian Institution, Washington, D. C.

Dr. Richard Cowan, Assistant Director, Museum of Natural History, Smithsonian Institution, Washington, D. C.

Sarah Clevenger, Indiana State College, Terre Haute.

Wilfredo H. Barrett, Instituto de Botánica (BAB), Buenos Aires, Argentina.

Dr. Edward T. Browne, Jr., Department of Botany, University of Kentucky, Lexington.

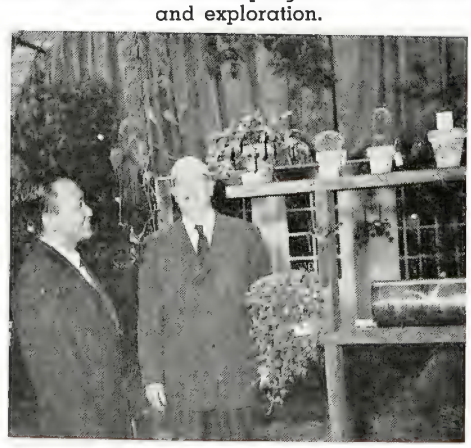
Dr. F. R. Fosberg, Pacific Vegetation Project, National Research Council, Washington, D. C.

Dr. R. C. Jackson, University of Kansas, Lawrence.

Dr. William A. Weber, University of Colorado Museum, Boulder.

Kathryn P. Harrod, Rutgers The State University, New Brunswick, N. J.

Dr. Didin Sastrapradja, of the Botanical Garden of Indonesia at Bogor, viewed the House Plant Show in the Conservatory during a tour of The New York Botanical Garden. He was accompanied on his inspection by Henry de la Montagne (right), Assistant Director Emeritus, Phil Clark, Public Relations, and Henry O. Whittier, of the Cryptogamic Herbarium, who attended school with Dr. Sastrapradja at the University of Hawaii. Dr. Sastrapradja's all-day visit was part of a tour of outstanding botanical gardens of the world, which he made on his return from the University of Hawaii to Indonesia. He was one of sixty promising botanical students sent out in 1961 from Indonesia, under instructions of President Sokarno, to study the various branches of botanical science and obtain their doctorates from universities in the United States, Canada, England, and Japan. The great importance attached to botany by the Indonesian President is indicated by the emphasis given the preparation of botanists for his country. Dr. Sastrapradja, a plant physiologist, was impressed with the Botanical Garden's public services as well as its programs of research and exploration.



Dr. Vernon T. Stoutemyer, Agricultural Sciences, University of California, Los Angeles.

Herbert A. Wahl, Pennsylvania State University, University Park.

T. L. Das, S. V. Agricultural College, Tirupati, Andhora, India.

Dr. C. Leo Hitchcock, Department of Botany, University of Washington, Seattle.

Dr. and Mrs. John R. Reeder, Yale University, New Haven, Conn.

Dr. Melvin L. Bristo, Botanical Museum, Harvard University, Cambridge, Mass.

Dr. A. E. Schuyler, Academy of Natural Sciences, Philadelphia.

Dr. Richard Howard, Director, Arnold Arboretum, Cambridge, Mass.

Dr. Frances Baker Cohen, Albert Einstein College of Medicine, New York, N. Y.

Dr. Dominick Pirone and Dr. J. Alexander, Fordham University, New York, N. Y.

Frank Abrahamson and Joseph D. Messner of Dancer, Fitzgerald, and Sample, Inc., New York, N. Y.

Drs. Margaret and Howard Bigelow, Department of Botany, University of Massachusetts, Amherst.

Dr. William A. Denison, Swarthmore College, Swarthmore, Pa.

Robert Ireland, University of Washington, Seattle.

Torrey Botanical Club. There has been a re-arrangement of the May program of the Torrey Botanical Club; Dr. W. I. Taylor, Director (Natural Products) of the Ciba Pharmaceutical Company, Summit, New Jersey, will speak on "Green Medicine" on May 4, 1965, at Columbia University, Schermerhorn Extension, and Dr. D. C. Torgeson of the Boyce Thompson Institute for Plant Research on "The Ecology of Pesticides in the Soil" on May 18, 1965, at The New York Botanical Garden.

Norman Taylor, who received the Distinguished Service Award of The New York Botanical Garden in 1961, has been appointed chief Botanical Consultant of the American Heritage Dictionary now in preparation.

Paul F. Frese of White Plains, New York, has been appointed naturalist in charge of the Westchester County, New York, Meyer Arboretum at Pound Ridge. The late Walter E. Meyer provided funds in his will, in 1957, for an arboretum to be established at Ward Pound Ridge Reservation in memory of his parents, Eugene and Harriet Meyer. The major objective of the arboretum is to develop interest in and understanding of the natural sciences and conservation.

Dr. Richard W. Holm, Director of the Division of Systematic Biology and Professor of Biological Sciences at Stanford University, has been appointed to the advisory post of Director of Advanced Research of General Bionomics, Inc., Santa Rosa, California. He has carried out extensive work on the *Asclepiadaceae*. His scientific writings include *The Process of Evolution,* recently published by McGraw-Hill; and as editor of *Evolution,* the journal for the Society for the Study of Evolution, he is sensitive to the latest concepts and theories in population studies, the application of which are important to plant breeding.

Dr. Holm's experience with ornamental plants includes gardening in the Middle West, Oregon, and California. His garden in Palo Alto is an interesting study of the succeessful integration of temperate and subtropical plants.

Scholarships in Geology and Botany will be established at the University of Missouri as a memorial to the late Ernest J. Palmer of Webb City, through a gift of $10,000 from his widow, Elizabeth M. Palmer, and their three children, E. MacDougall, Grace E. and Theodore W. Curators have designated the gift as the Ernest G. Palmer Memorial Scholarship Fund.

Mr. Palmer, who was an internationally known, self-educated naturalist, devoted his lifetime to the study of botany and geology of Missouri and surrounding territory. His collections of materials, recognized as one of the best in existence, was willed to the University. An honorary degree of Doctor of Science was to have been conferred upon him in June, 1962, but he died in February of that year.

Theodore A. Weston Memorial Scholarship. Plans have been made to establish a scholarship in memory of a widely known and respected horticulturist and editor, Theodore A. Weston. It will be awarded to incoming freshmen at Rutgers, The State University, New Brunswick, New Jersey, who are interested in plant sciences. The University's plant science curriculum offers majors in general horticulture, landscape design, florist-nursery management, forestry, field crops, and turf management. The scholarship fund will be supported, in part, by funds received from the sale of photographs and the rentals of transparencies from Mr. Weston's collection. Information on black and white photographs may be had from Ruth Marie Peters, 430 Abbott Avenue, Ridgefield, New Jersey; on the slides from Mrs. John Roche, Box 88, Caldwell, New Jersey.

A memorial trophy will be presented annually, beginning with the 1966 International Flower Show, for the most outstanding exhibit of dwarf, woody plants.

The scholarship fund and the trophy fund will also be dependent on contributions from organizations and individuals. Checks, payable to The Theodore A. Weston Memorial Fund, may be sent to any member of the committee, among whom are Phil and Ruth Alampi, Eugene S. Boerner, David Burpee, Jan de Graaff, Samuel H. Gottscho, Dorothy E. Hansell, Gretchen Harshbarger, Margaret Herbst, Carleton Lees, Ralph E. Perkins, Gustave Springer, and Miss Peters and Mrs. Roche.

Pennsylvania State University's Correspondence Courses in Horticulture, agriculture, and home economics are a unique service among institutions of higher learning. Completion of courses of sixty or more "study points" entitles a student to an achievement certificate.

The courses, initiated in 1892, have enrolled more than two hundred thousand persons during the intervening years. In 1964, the program extended through all fifty states of the United States and twenty-one foreign countries for a total of 17,261 new enrollments.

A new course on roses, their culture and care, has been added. Copy of this course for $1.25 may be obtained by writing to Box 5000, University Park, Pennsylvania 16802. A course on "Home Vegetable Gardening" for $2.00 or on "Home Floriculture" for $2.50 may also be obtained from the same address.

Open Space in Urban Design is the title of a report prepared for the Cleveland Development Foundation by Michael Rapuano, Dr. P. P. Pirone, and Brooks E. Wigginton, under the sponsorship of the Junior League of Cleveland, Inc. Mr. Rapuano is a member of the Board of Managers of The New York Botanical Garden, Dr. Pirone is the Garden's Senior Plant Pathologist, and Mr. Wigginton is a noted landscape architect of Wheeling, West Virginia.

The Society of Amateurs of Horticulture in Tarnow has published *The Gardener's Adviser,* a calendar for 1965, of three hundred pages. This interesting publication contains dissertations on floriculture, pomiculture, agriculture, apiculture, vegetable growing, herbs, and zoo-techniques. Outstanding scientists give valuable advice in a popular manner. The best varieties of fruits as well as of tulips, dahlias, roses, and other ornamentals are pictured in color. Copies of *The Gardener's Adviser* are available from the Society of Amateurs of Horticulture, Tarnow, Matejki 13, South Poland.

The Horticultural Exhibition of the German Western Republic which opened in Essen, Germany, on April 29, 1965, will continue until October 17, 1965. The exhibition, covering three hundred and twenty acres, emphasizes "The World of Plants" with beautiful displays of thousands of bulbs, annuals, perennials, and dahlias. Then, because the old Botanical Garden has been included in the area, there will be a special exhibit of research on perennials and evergreens. Another interesting exhibit portrays the life of bees. Jan de Graaff of Oregon is expected to show some of his superb lilies.

The House and Garden Tour of the Millbrook Garden Club will be held on May 20, 11 a.m.-4:30 p.m. for the benefit of Sharon Hospital. There will be an exhibition of needlework at Thorndale, also tea. Tickets are $4.00.

The American Rhododendron Society will hold its annual meeting at Planting Fields, Oyster Bay, Long Island, on May 21-23, 1965, with additional tours to rhododendron gardens on Long Island and New Jersey, May 24 and 25.

Among those participating in the panel discussion on the first day will be Dr. Clement G. Bowers, Professor Harvey Gray, David G. Leach, Guy Nearing, Dr. Henry T. Skinner, Paul Vossberg, and Dr. John C. Wister.

Guest speaker at the dinner on May 21 will be Milton V. Walker, M.D., of Cresswell, Oregon, his subject "The Genesis of the Rhododendron Species Foundation and Rhododendron Species in Great Britain." At the dinner on the next evening James Russell of Windelsham, Surrey, England, will talk about "A Hybridist's View of the New British Varieties and Species Forms."

Annual Tree Peony Festival will be held at William Gratwick's estate in Pavilion, New York, from May 22-31, 1965. The formal garden area, constructed in 1908 by Mr. Gratwick's father William G., but abandoned for the past twenty-five years, will be reopened. The planting in the area has been renovated to feature choice hybrid tree peonies; these are expected to be in full bloom for the festival.

The Ceanothus Section of the Santa Barbara Botanic Garden has always been a main point of interest. Paths wind through a variety of flowering shrubs, redbud, Nevin barberry, fremontia, and gooseberries, and ceanothus. *Ceanothus cyaneus* from San Diego County, *Ceanothus griseus* from the Monterey Peninsula, *Ceanothus jepsonii* from Marin and Sonoma Counties, and *Ceanothus purpureus* from the Napa Range are among a few of the plants, sometimes known as California lilacs, in the Botanic Garden's fine collection.

The abundant, pale blue flowers of *Ceanothus spinosus.*

The season began in early January when large specimens of bigpod ceanothus and its variety with pendulous branches were covered with fragrant, white flowers. Then greenbark ceanothus, *C. spinosus,* bearing large sprays of pale blue flowers, contrasted with the horticultural varieties 'Concha', 'Sky Blue', and 'Blue Cloud' which are deep blue in color, and with coast ceanothus and hollyleaf ceanothus, both with lavender flowers.

Ceanothus is a genus of shrubs restricted to North America; it contains about fifty species, most of them native to California. They vary in size and shape from ground covers, such as 'Carmel Creeper', to small trees up to twenty-five feet tall, such as the Catalina ceanothus and greenbark ceanothus.

In the early 1900's this group of plants began to gain favor in California and, after its founding, the Santa Barbara Botanic Garden became a center for the study of *Ceanothus.* It possesses one of the world's finest living collections and published a major work on the subject in 1942, unfortunately now out of print.

Since that time the Santa Barbara Botanic Garden has improved methods for the culture and propagation of these plants. Ceanothus 'Far Horizons', developed at the Botanic Garden recently, is an early-blooming, low-growing, compact plant with bright blue flowers; it is now available in limited quantity in the nursery trade.

An Insecticide for Use on Elms. Shell Chemical Company, a division of Shell Oil Com-

pany, has received clearance from the United States Department of Agriculture, to manufacture and distribute "Bidrin" an insecticide for use on elm trees—to "vaccinate" healthy elms against the fungus-carrying beetle that spreads the Dutch elm disease.

"Bidrin," a toxic insecticide, will not be sold to the public. Its distribution will be limited to arborists, foresters, and horticulturists who have satisfactorily completed a training program to be supervised by Shell in different parts of the country. This organic phosphate insecticide does not cure the fungus but repels or destroys the fungus-carrying beetle on emergence from its winter breeding places in dead or dying elms. It is injected into the trunks of healthy elms in early spring and flows through their circulating system, reaching the outermost branches and twigs where ninety per cent of the bark beetle feeding occurs.

"Bidrin" has undergone extensive field tests, in cooperation with land grant colleges, during which its effectiveness as a Dutch elm disease control has been demonstrated. While it is a toxic material, and all precautions must be taken to safeguard personnel when using it, once injected into the tree it is harmless to humans, domesticated animals, birds and other wildlife, and the tree itself.

Seven companies in the Midwest and the Bartlett Tree Service Company of Stamford, Connecticut, have contracted to distribute "Bidrin" through trained applicators.

Celosia 'Sunburst', a new dwarf variety, is disease-resistant and heat-tolerant. It adds a gay note to a bed of annuals almost till the appearance of frost, and is useful as fresh-cut or dried flowers in arrangements. The flowers, harvested on stems, are hung upside down for a week or two to dry. Introduced by Northrup, King and Co., celosia 'Sunburst' comes in a packet which contains two inner packets, one with seeds of the scarlet-colored form, the other with seeds of the gold.

Celosia 'Sunburst'.

BOOK REVIEWS

HERBS AND THE FRAGRANT GARDEN. Brownlow, Margaret, 223 pages, illustrated paintings by the author, indexed. McGraw-Hill Company, New York. 1965. $9.95.

The second and revised edition of Miss Brownlow's book is such an improvement in size, quality of paper, color in the illustrations, and arrangement of leaves or flowers of herbs upon the plates that readers of the first issue would want to own the second. The proprietor of The Herb Farm, Seal, Seven-oaks, Kent, England, presents hundreds of species of herbs and fragrant shrubs in such a way as to make the American gardener dream of Hidcote and Sissinghurst, even if he has been there only via slides of returned travelers. Four fine photographs of English herb gardens show what old stone walls and clipped yew hedges do to enhance their beauty. The book is produced in the style of Eleanour S. Rohde's great books on herb gardening. The lavish use of color to reproduce the author's paintings can only make American publishers envious.

The list of plants, some of which would be tender in our northern sections, offers ideas for enlarging our selection beyond the relatively few varieties available from nurserymen. A few, such as the golden-leaved lemon-balm sent to me as a gift some years ago by Miss Brownlow, might prove disappointing in gardens where many bright sunny days cause the variegated varieties to go quite green except in spring and fall.

The recipes and notes on cultivation are incidental to the real meat of the book which is the herbs and their history; a better dinner of herbs would be hard to find in a recent publication.

GERTRUDE B. FOSTER, EDITOR
The Herb Grower Magazine
Falls Village, Conn.

HERB GARDENING. Loewenfeld, Claire. 256 pages, illustrated, indexed. Charles T. Branford Company, Newton Centre, Mass. 1965. $5.95.

The founder of Chiltern Herb Farms, Near Tring, Herts, England, approaches herbs from the nutritional standpoint as well as the horticultural. As the author of two other books in Britain's Wild Larder Series, one on fungi and the other on nuts, she is very firm about the values to be gained from growing herbs with natural methods rather than chemical fertilizers. She also believes in the whole herb as beneficial to health rather than the extracted bits used in medicine:

"It is not only the palate which benefits from the use of herbs—there is above all a benefit to health. There are specific substances in herbs, which, if taken daily, add greatly to healthy functioning of the body; for instance, mineral salts, volatile oils or the bitter principles. The herb is still a mysterious concentrated plant which invites a certain amount of guesswork. It does though seem reasonable that this little medicine chest of active substances should be used whole, rather than be analysed as to its chemical parts, taken to pieces, extracted or synthesized. Important principles, and also the value of the interaction of the various principles, may be lost otherwise. Little research has been done yet, which is perhaps just as well; it may be better in this case to leave nature alone."

Claire Loewenfeld then gives very detailed descriptions of over fifty useful culinary and medicinal herbs, which are adapted for American readers by giving the height in feet as well as in centimeters, and instructions for growing them. There is nothing vague or ephemeral about the details here; it is easy to recognize the experienced gardener writing from actual practice. Eight handsome photographs of common herbs enhance a book which has the kind of helpful clarity we have not seen in herb literature since Maude Grieve's *Culinary Herbs and Condiments*. There are also recipes because the author believes in using herbs—some of them one might never think of bringing into the kitchen, such as nettles and mullen.

GERTRUDE B. FOSTER

GARDEN SPICE AND WILD POT-HERBS. Muenscher, Walter C. and Myron A. Rice. 211 pages, illustrated, indexed. Cornell University Press, Ithaca, N. Y. 1965. $10.00

America has no reason to bow to Great Britain when it can produce a work of art in the manner of the old masters, reproduced by modern lithography for a mass audience. Dr. Edgar Anderson of the Missouri Botanical Garden said of *Garden Spice and Wild Pot-Herbs*, when it first appeared in a popularly priced edition, "At last we have a modern book to rival the great herbals of the fifteenth and sixteenth centuries. Here are pictures which are a delight to the eye, yet so distinctive of the plants they portray that the better one knows these herbs, the more he will treasure the pictures as portraits of old friends."

The text is sound, well written, and botanically accurate. However, the artist is the strength of the book. Elfriede Abbe designed the book, produced the beautiful woodcuts, fifty-six of them, and, most important of all, set the first edition by hand from old type, printing the first limited edition herself. Miss Abbe is well known for her prize-winning sculptures in wood and bronze and her sculptural portrait of Liberty Hyde Bailey and memorial panels for the Mann Library at Cornell University. But she is not sufficiently recognized for her American herbal which in its third printing is now encased in a pleasant green slipcover to give it the attention it deserves.

GERTRUDE B. FOSTER

HERB AND GARDEN IDEAS. Doole, Louise Evans. 128 pages, line drawings, indexed. Sterling Publishing Co., New York, N.Y. 1964. $2.95.

A book of ideas, dedicated to children who love to experiment with seeds and plants, *Herb and Garden Ideas* will appeal to Scout leaders and adults who seek to lead children down the fragrant path to herb gardening. Two packets of herb seeds are pasted inside the back cover to provide further enticement. It is gaily illustrated with sketches which are more illustrative of the ideas than of plants. No botanical names are used which may seem to make it easier for youngsters, but could mean difficulty in locating seeds or sources of plants.

GERTRUDE B. FOSTER

TALL TREES AND FAR HORIZONS. ADVENTURES AND DISCOVERIES OF EARLY BOTANISTS IN AMERICA. Eifert, Virginia S. 301 pages, illustrated, indexed. Dodd, Mead & Company, New York. 1965. $5.00.

Here is an engaging introduction to the romantic tale of plant exploration in United States and adjoining Canada from Colonial times up through the nineteenth century. Kalm, Bartram, Michaux, Nuttall, Douglas, each deserve and each get a full chapter; and sections are devoted to the early settlers on the Atlantic Coast, the Lewis and Clark Expedition, the railroad sur-

veys of the West, and others. It seems odd to find in this company an account of Linnaeus's Lapland journey; Linnaeus was not a great explorer and was far from being the first botanist to fare forth into the wilderness. Some will think it curious to find John Muir and Thoreau classed as botanists, even though as naturalists and philosophers they may have considered the lilies of the field.

The author has tapped the best sources and presents the material in a semifictional style suited to a popular account. There are a few really incorrect statements (e.g., Linnaeus is *not* a latinized form of Linne), but these do not detract seriously from the engrossing nature of the plot. The subject, after all, sets its own scale. A small section of photographs is a pleasing adjunct. although some strain is felt in an attempt to tie each into some point of the text. The decorations throughout, in particular the line drawings of plants, are quite charming. The bibliography is a valuable and admirable feature of the book.

RUPERT C. BARNEBY

SHORE WILDFLOWERS OF CALIFORNIA, OREGON AND WASHINGTON. Munz, Philip A. 122 pages, illustrated (part color), indexed. University of California Press, Berkeley. 1965. Cloth $4.75, paper $2.95.

The fourth and last contemplated of Dr. Munz's wildflower books covers the Pacific Coast from San Diego north to Puget Sound, an area rich in peculiar and spectacular plants. Like its predecessors, this small volume is full of interesting lore presented informally but with exacting correctness, and well serves its purpose of introducing the amateur botanist or summer visitor to a world of delight and wonder. Naturally only a fraction of the coastal flora can be mentioned in a book of this size, but enough of the main types, including ferns and trees and inconspicuous or weedy plants, are represented by figure or photograph to lead the inquirer to the genus at least. A captious critic might complain that some of the ninety-six kodachromes lack ideal brilliance of coloring. But the 177 line drawings, largely the work of the gifted Mrs. Janish, are of the expected high quality. The author is to be congratulated on completing the series. Could he not be persuaded to do as much for some of the interior western states?

RUPERT C. BARNEBY

FLOWERS FOR THE KING. Steele, Arthur R. xv+378 pages, illustrated, indexed. Duke University Press, Durham, North Carolina. 1964. $10.00.

After having visited much of the Spanish Empire in the New World, Humboldt was impressed by two political facets of this realm, the civil repressions and the large sums expended in plant exploration. The latter feature was well illustrated by the crown-sponsored botanic expeditions to Mexico, New Granada, and Peru-Chile during the eighteenth century; all were extended enterprises and the publication of scientific results was delayed in each instance. The general outlines of the travels of Ruiz and Pavón in South America have been available in both Spanish and English for some years. In *Flowers for the King,* more details, especially the political overtones, have been added to the field work and the post-expedition history has been unraveled through investigations in Europe and South America.

Hipólito Ruiz and José Pavón, accompanied by the adventure-prone French botanist Joseph Dombey, left Europe late in 1777 and arrived in Peru five months and four days later. Dombey returned to Europe in 1784 and the Spanish pair in 1788. During the years of field work, both the coastal and interior regions of central Peru, as well as Concepción and Santiago in Chile, were visited for extended periods. Artists accompanied the botanists and drew illustrations from living plants. Juan Tafalla was trained in botanical techniques during the Peruvian stay and continued valuable collecting in Ecuador after 1788.

Upon Ruiz and Pavón's return to Spain, King Charles IV solicited financial aid from the New World colonies for the publication of a Peruvian Flora. Despite both bureaucratic and temperamental hindrances, Ruiz pressed toward the publication until his death in 1816. Rivalries with L'Heritier and Cavanilles were disrupting influences, but Ruiz lived to see the first three volumes of the *Flora Peruviana, et Chilensis,* as well as a "Prodromus" appear in print. After 1816, Pavón, of less scientific bent than Ruiz, did little toward completion of the Flora; his sale of specimens to Lambert in England did unveil the richness of the central Peruvian flora to other European botanists. The discovery, by Dr. Steele in Madrid, of most of the Lambert correspondence with Pavón revealed much new information on the dispersal of the collections.

In the world of today when "pure" plant taxonomy has been relegated by scientific faddists to the role of a peripheral cultural influence, the involvement of the kings of Spain and their highest ministers in the survey of a tropical flora seems unbelievable, even considering the economic benefits then expected. Dr. Steele has been able to place Ruiz and Pavón in relation to the evolution of the later Spanish Empire; scientific details were corroborated by him through consultation with many European and American botanists. The chronicle of botany has been greatly benefited by Steele's perspective as a trained historian. Everyone interested in plants should have in his library and read *Flowers for the King.*

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RHODODENDRONS & AZALEAS. Berrisford, Judith. 288 pages, illustrated, part color indexed. St. Martin's Press, New York. 1965. $9.50.

This delightful book, written by a resident of North Wales, shows her familiarity with this noble genus and with its garden value in Great Britain. The first part of the book is devoted to the historical and gardening aspects of rhododendrons. The second part lists the species and hybrids with their horticultural requirements. It is interesting that she considers *R. racemosum* hardy for "California coast only in U.S.A." A strain of this dwarf species is very popular in our cold northeastern states. *R. augustinii,* on the other hand, has not proved hardy in Delaware. I missed the beautiful yellow *R. keiskei* in her list of recommended dwarf species. In the New York area, one cannot keep up with the demand for this species. Similarly, a half dozen hybrid dwarf rhododendrons of notable hardiness and beauty are not mentioned. The two dozen black-and-white photographs are superb, and there are four colored plates.

MARY FLEMING

THOREAU ON BIRDS. Cruickshank, Helen 331 pages, illustrated, indexed. McGraw-Hill Book Company, New York. 1964. $7.95.

These selections from Thoreau's forty notebooks from which he wrote his "Journal" and "Walden" are compiled and edited for leisure-time reading. The Introduction gives the philosophy of the man who made his own pencils and built his own cabin on Walden Pond (at a cost of $28.12½) in which he lived two years, two months, and two days. His earlier writings did not concentrate on birds, and his bird watching was done for a dozen years without the use of his "Spyglass."

The central part of the book, pages 38-204, gives commentaries on many of the birds that Thoreau recorded, including the dates on which he wrote them. Some of the species have only one quotation, others four or five. It is interesting to find him using the same words or phrases in descriptions in succeeding years. The notes on these birds are arranged in the order of the American Ornithologists Union list, starting with the loons and ending with the sparrows. The author's commentary is enclosed in brackets, but is often so long that it is hard to know whether one is reading Thoreau or Cruickshank. Perhaps the use of different print would have eliminated the difficulty.

The only illustrations, besides a map of Concord and a sketch of Thoreau, are taken from his Ornithological Reference Books. These sixteen pages of the bird books of a century ago make one realize how fortunate we are in our modern field guides. Most of these earlier paintings were made from dead birds.

The latter part of the book contains excerpts from his writings, including General Bird Notes, Birds of Massachusetts, trips down the Concord and Merrimack Rivers, to Maine and Cape Cod, and the final trip in 1861 to Minnesota. This trip, it was hoped, would help in his fight against tuberculosis. Thoreau's Concord Bird List, giving modern names with his names in parenthesis and the alphabetical list of all his birds, provides the student of today with the opportunity to realize the changes that have taken place in a century of population expansion on the East Coast.

GRACE COIT MELENEY

COLLECTORS ALPINES—THEIR CULTIVATION IN FRAMES AND ALPINE HOUSES. Heath, Royton E. 527 pages, illustrated, indexed. Distributed by Taplinger Publishing Company, New York. 1964. $15.00.

This impressive volume is the fourth in a series of publications by the British horticulturist and author Royton E. Heath. It is a more ambitious and expanded production than its predecessor, *Alpine Plants Under Glass,* published in 1951. The previous volume had similar coverage in its introductory paragraphs and then referred to about five hundred species and varieties of plants. The present book covers over eighteen hundred plants, all grown by the author. Eeach genus is accompanied by suggestions on methods of cultivation and propagation

of the various species included. This part of the book consumes about two-thirds of the volume. The first third explains and illustrates in detail the many facets of growing these plants and the specialized methods required for their care in containers and under glass—that is, in alpine or glasshouses and frames. Every needed construction and layout detail is covered. The following chapters deal with composts, propagation by seed and cuttings, maintenance, pests and disease, and finally a chapter on exhibiting.

In evaluating this book, it is necessary to realize that it was written for the British enthusiast and for the climate and conditions as they exist there. The American gardener must learn to convert the text to the climatic and physical conditions for particular areas in this country. This same caution applies to most British horticultural books and periodicals. Much of the information is useful as applied to outdoor rock gardening. However, there is a question of plant hardiness for the listed species, many of which cannot tolerate the climate of most areas in the United States. This specifically applies to the many New Zealand alpines included in the listed species. There are few areas (perhaps only the West Coast around San Francisco and the Pacific Northwest) in which this group of plants can be grown outdoors.

Unfortunately, there are very few American growers who have concentrated on cultivating alpines in frames and alpine houses. Incidentally, the term "alpines" as used in this text should not be construed literally, for it encompasses wild species plants from all zones—from the lowlands to the mountains. While the encompassed eighteen hundred plants cover a wide classification of plants, conifers, bulbs, heathers, true alpines, and even many American native plants not available here, it must omit many favorites of keen growers. Its weakest coverage is among the bulbs, for there are many choice species which should have been included. The text is well illustrated with photographs and line drawings, but the photographs, which are half page or larger, are of varying clarity and quality.

Considering the lack of American publication texts on this phase of specialized horticulture, it is a desirable volume for the keen plantsman.

HAROLD EPSTEIN
Larchmont, N. Y.

SOME EDIBLE MUSHROOMS AND HOW TO COOK THEM. Faubion, Nina Lane. 199 pages, illustrated (part color), indexed, glossary. Binfords & Mort, Portland, Oregon. 1964. $3.95.

This enlarged and revised second edition resulted from the popularity of the first edition, published in 1938. It is a useful handbook for the amateur mushroom hunter, since it stresses the differences between the poisonous and nonpoisonous mushrooms. The eighty or so culinary recipes will surely have special appeal for the mycophagist.

MARY FLEMING

PHILATELIC THERAPY. Cochran, Emory E. W. J. Stowell Printing Co., Federalsburg, Md. 102 pages, illustrated, indexed.

The only thing better than a book about your favorite hobby is a book which combines two of your special interests. For many readers of *The Garden Journal*, this slim volume will do just that, for it illustrates and describes forty-two medicinal plant stamps of Jugoslavia and is rich in painstakingly researched lore of both philately and botany—and medicine, too. The stamp series, issued between 1955 and 1963, were printed by the distinguished Swiss engravers, Courvoisier S.A.

PHIL CLARK

COMMON TREES OF PUERTO RICO AND THE VIRGIN ISLANDS. Little, Jr., Elbert L. and Frank H. Wadsworth. 548 pages, illustrated, indexed. Superintendent of Documents, United States Government Printing Office, Washington, D. C. 20402. 1964. Cloth $4.25.

As many plants have become pantropic through the agency of man, Elbert L. Little, Jr., and Frank H. Wadsworth's *Common Trees of Puerto Rico and the Virgin Islands* is a book of considerable usefulness for residents of the Hawaiian Islands. Dendrologist Little of the Division of Timber Management Research, United States Forest Service, Washington, D.C., and Director Wadsworth of the Institute of Tropical Forestry, Forest Service, Puerto Rico, have produced a 548-page work with two hundred and fifty full-page illustrations, one hundred of them with distributional maps. Published by the United States Department of Agriculture in July, 1964, Handbook No. 249 in board covers is truly a bargain.

Though the book is nontechnical, it wisely gives the scientific name as well as the vernacular ones of the trees involved. It has useful keys for the identification of pertinent families, genera, and species, the first step for identifying an unknown tree being the simple one of placing it in one of four categories based on leaf character: whether alternate or opposite, simple or compound. Among other information, the authors describe the plant as a whole, whether its fruit is edible or not, the type of its wood and its uses, and the geographical distribution. For us residents of Hawaii Nei, however, about one third of the species discussed are of particular interest as these—such as the African-tulip, breadfruit, casuarina, coconut, mahogany, mango, noni, papaya, plumeria, soursop, ylang-ylang—grow in our gardens or forests.

It were strange indeed if a book of this scope lacked a few type and other errors, such as the spelling of "speciment" on page 21, the recording of *Prosopis juliflora* as "naturalized in Hawaii" when another species is involved, and the use of *Leucaena glauca* for our *haole koa*, when *L. leucocephala* appears to be the correct binominal. The reviewers are particularly sensitive to this last error, since they themselves have made it in their own writings.

OTTO DEGENER,
Collaborator in Hawaiian Botany
ISA DEGENER,
Co-author *Flora Hawaiiensis*

AN ECOLOGICAL APPROACH TO CONSERVATION. Hamm, Russell and Larry Nason. 366 pages, illustrated, indexed. Burgess Publishing Company, Minneapolis, Minn. 1965. $6.75.

An Ecological Approach to Conservation is published as one of the Burgess Education Series. As stated by the authors, "this book is an attempt to present an overview to the whole area of conservation—as a resource for teachers, for elementary, secondary, and college students, and for layman." The need for such a resource book is well documented, and the text should be quite suitable for the elementary or secondary student of conservation. Their addition of such topics as "Recreational Resource Values," "Air Pollution," "Chemical Pollution," "The Role of Nuclear Science in Conservation," and "Population Dynamics" to the more general topics of soil, water, grasslands, and forest conservation demonstrates the attempt to present the student with both a current and fresh approach to the problems of conservation in our modern and increasingly complex society. Each of the fifteen chapters includes a brief introduction, a survey of the historical background, a recommended group of activities for the various educational levels, a limited bibliography, and suggested audio-visual materials.

In this broad sweep of complex subjects, the treatment of each subject is quite superficial, severely limiting the usefulness of the text to teachers and students at the college level. The bibliography at the end of each chapter often omits fundamental background references, e.g., in Chapter IX, "Wildlife Conservation," no mention is made of Leopold's *Game Management* or Lack's *The Natural Regulation of Animal Numbers*.

Many of the chapters present excellent accounts of the current problems in conservation. The authors have used material from local newspapers to good advantage in relating the problems to areas which the student will find directly related to problems occurring in and near his own home. The photograph of a large number of rotenone-poisoned fish (Fig. 53) is a misleading choice of an illustration for comparison with a view of a beautiful stream free of chemical pollution (Fig. 54), since rotenone is a valuable tool in fisheries management and is used to great advantage in the removal of undesirable trash species.

The glossary, which ranges from "Abortion" to "Zoologist," is again very limited and often over-simplified—to such an extent as to be misleading to the student. "Niche," for instance, is defined as "Standard 'jobs' which are filled by different species in natural communities," leading one to inquire how the authors might define "jobs." "Sheet erosion" is incorrectly defined as the "loss of a thin layer of soil due to standing water." The abstract illustrations by John Grengs preceding each chapter are cleverly drawn and, in most instances, provide an insight into the chapter material.

This attempt to present a modern and in some topics certainly a unique *Ecological Approach to Conservation* will prove itself quite useful to teachers and students alike at the elementary and secondary levels of education and should be a valuable aid to instructors in conservation activities in summer schools and camps teaching at these educational levels.

RONALD DAGON

DAVID HOSACK—CITIZEN OF NEW YORK. Robbins, Christine C. 246 pages, illustrated, indexed. The American Philosophical Society, Philadelphia. 1964. $3.50.

David Hosack was unusual. Even in an era of eminence in young America, he stood out as

a giant. He was born on August 31, 1769, of "relatively humble origin." He attended Columbia College and Princeton, and then studied medicine in New York and Philadelphia. He continued his medical education at Edinburgh and London.

Upon his return to the United States he became a very successful and outstanding physician. He was also on the staff of Columbia College, of the College of Physicians and Surgeons, and subsequently served as president of the short-lived Rutgers Medical School in New York. In his later years he was a "gentleman farmer and horticulturist" on a seven-hundred-acre estate at Hyde Park, New York. He died on December 22, 1835.

Dr. Hosack was scientifically and socially prominent. He was widowed twice, married three times, and the father of ten children. He counted among his friends, acquaintances, or patients such men as Samuel Bard, De Witt Clinton, Thomas Jefferson, Robert Fulton, and Gouverneur Morris. He was the attending physician to Alexander Hamilton on July 11, 1804, the day of his fateful duel with Aaron Burr, and he was with Hamilton when he died the next day.

With all of his varied and vigorous pursuits, Hosack's boldest and most original stroke was his establishment of The Elgin Botanic Garden, at his own expense, on the site where Rockefeller Center now stands in the City of New York. This was "the first public botanical garden in the United States"; it waxed in the first decade of the nineteenth century and waned in the second. The alchemy of time has transformed Hosack's dream of green to one of gold —for the Trustees of Columbia University, who still hold title to most of this now valuable property.

This volume is illustrated with twenty-three figures and a frontispiece. Nine of these are of David Hosack; two are of the Elgin Garden.

There are twenty-nine pages, in fine print, of "references." These include relevant articles, a list of publications by David Hosack, and citations to letters which he wrote, and to those pertaining to him.

No one can portray Hosack's life faithfully without tracing his high hopes, his frustrations, his marked and unusual medical accomplishments, his controversies. Mrs. Robbins has done this in her carefully studied, amply annotated biography of this dynamic man.

EDWIN B. MATZKE
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PHYSIOLOGICAL BASIS OF SALT TOLERANCE OF PLANTS. Strogonov, B. P. 279 pages, illustrated, bibliography. Daniel Davey & Co., Inc., New York. 1964. $14.00.

In the Soviet Union some ten per cent of the soil is saline to some extent, and a vast amount of Russian work, ably summarized, centers on problems of growing cotton in central Asia. Non-Russian literature is also well covered. The author emphasizes that one must know exactly with which salts one is dealing. He places much hope in an orthodox breeding program for salt resistance, carefully skirting the morasses of Lysenkoism. The book abounds in fascinating detail, such as the use of sunflowers for selectively removing sodium chloride while its enormous water consumption lowers the water table. Symptoms of salt damage are described in detail. The cellular basis of salt damage and salt resistance remains a mystery to which this book is an excellent introduction. Our recent controversy with Mexico over the salinization of lands watered by the Colorado, and the large scale American-Pakistani efforts to desalt the Indus Valley attest to the world-wide importance of the issues raised in this book.

S. H. HUTNER
Haskins Laboratories
New York, N. Y.

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PHYLOGENY AND FORM IN THE PLANT KINGDOM. Dittmer, Howard J. 642 pages, illustrated, indexed. D. Van Nostrand Company, Princeton, New Jersey. 1964. $11.25.

In this textbook, designed for a course in plant morphology, the author has consistently attempted to interpret the structure of the great group of plants in the light of their probable evolutionary relationships. His efforts to keep up with modern evolutionary thought have met with mixed success. If there are any mycologists, algologists, or general evolutionary theorists who see a phylogenetic progression from flagellates to red algae to higher fungi, I don't know who they might be.

ARTHUR CRONQUIST

THE LIFE OF PLANTS. Corner, E. J. H. 315 pages, illustrated, indexed. World Publishing Co., New York. 1964. $12.50.

This beautifully written book assumes no initial knowledge on the part of the reader and carefully guides him to an understanding of plants and plant life from a naturalist's point of view. Drawing on his wide experience in both tropical and temperate regions, the author presents his own synthesis in sprightly and largely nontechnical language. Some of the interpretations would not be subscribed to by the majority of botanists, but so distinguished a botanist as Dr. Corner has a right to his own outlook, and majority rule is, in any case, a faulty guide to scientific truth. This book is not the place to search for a specific fact, but it is the thing from which to gain a broad understanding with minimal pain. It can be wholeheartedly recommended to the interested public, and professional botanists might also profit from reading it.

ARTHUR CRONQUIST

GUIDE TO THE WOODY PLANTS OF UTAH. Treshow, Michael, Stanley L. Welsh, and Glen Moore. 161 pages, illustrated, indexed. Bruett Press, Boulder, Colorado. 1964. Spiral, $3.00.

This is a set of keys to some of the wild and commonly cultivated woody plants of Utah, offset-printed and in a plastic ring-binder. Some four hundred species, three hundred of them cultivated, are included. The book reflects an interpretative compilation rather than an inpendent assessment of the taxa. It appears to be designed for students taking a course in identification of trees and shrubs in Utah.

ARTHUR CRONQUIST

PRINCIPLES OF QUANTITATIVE GENETICS. Mather, Wharton B., Burgess Publishing Co., Minneapolis, Minn. 152 pages, appendices, tables. 1964. $5.50.

The author is a member of the staff of the University of Queensland, Brisbane, Australia. His book is intended as a workbook for students interested in the various biometric, largely statistical, methods employed by geneticists. There are three sections: A) Statistical Genetics; B) Population Genetics; C) Biometrical Genetics. A fourth part, appendices, includes various statistical tables, answers to problems, and references.

The text is printed on the left-hand page, leaving the right for notes and problem-solving. A number of problems pertinent to the topics are given in each section. Explanations or descriptions of the various procedures, not specific to the solving of the problems, are set apart in boxes.

DAVID J. ROGERS

PLANT VIROLOGY. Corbett, M. K. and H. D. Sisler, Eds. 527 + XVII pages, illustrated, indexed. University of Florida Press, Gainesville, Florida. 1964. $12.50.

This book was compiled from a series of lectures presented at an NSF-sponsored Institute in Plant Virology at the University of Maryland in 1963. The various topics in plant virology, as well as some in closely related areas, are covered in separate chapters by twenty-one contributors, all outstanding authorities in their respective areas. Some of the treatments are essentially rehashings of review papers which have appeared elsewhere, but most present information not otherwise available in this form.

As in any book in which a number of contributors independently prepare chapters on specific subjects, there are some areas which are not covered as fully as they should be, but these are surprisingly few. Overall, the book is an excellent one, and certainly the most comprehensive available on this subject.

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BRIEF NOTES ON RECENT BOOKS

WILD FLOWERS

REDWOOD EMPIRE WILDFLOWER JEWELS. Young, Dorothy King. 80 pages, illustrated (part color), indexed. Naturegraph Company, Heladsburg, Cal. 1964. Cloth $4.50, Paper $2.95.

This popular introduction to the wild flowers of an area extending from the Big Sur in Monterey County and along the northern coast of California, inland as far as Napa County, and north to Curry County in southwestern Oregon, is written from the author's intimate association with these plants and her desire to acquaint others with the heritage which is in danger of destruction.

GREAT SMOKY MOUNTAIN WILDFLOWERS. Campbell, Carlos C., William F. Hutson, Hershal L. Macon, and Aaron J. Sharp. 88 pages, illustrated (color), indexed. University of Tennessee Press, Knoxville. 1964. Paper $1.50.

This attractive, enlarged edition—the first was published in 1924—was made possible through the "substantial assistance" of the Great Smoky Mountains Conservation Association. Special emphasis has been placed on informing visitors to the Smokies where the plants may be seen and when.

NORTHERN NON-WOODY PLANTS. Moyle, John B. 108 pages, illustrated, indexed. Burgess Publishing Co., Minneapolis. 1965. Spiral $3.90.

This field key to the more common ferns and flowering plants of Minnesota and adjacent regions was first published in 1938, republished in 1953. The 1964 edition has been rewritten and somewhat expanded. Plates have been added on: 1) the grouping of plants in the key; 2) the relationships of vegetation and floral characteristics of the more common plant families to phylogeny; and 3) plant parts.

SPRING WILDFLOWERS OF THE SAN FRANCISCO BAY REGION. Sharsmith, Helen K. 192 pages, illustrated (part color), indexed. University of California Press, Berkeley, Cal. 1965. Paper $2.25.

This little book, one of the California Natural History Guides, acquaints the reader with more than three hundred species to be found blooming in spring in the area covered. Any unusual folklore, reputed medicinal value, poisonous properties, and so on are included. The book also includes information on taking field trips, making an herbarium, and growing wild flowers.

BONSAI

PRACTICAL BONSAI FOR BEGINNERS. Kenji, Murata. 120 pages, illustrated, glossary. Japan Publications Trading Company, Rutland, Vt. 1965. $3.95.

As the title indicates, this book is directed to the beginner who "should not expect to create a masterpiece but [who] can, with care, produce an admirable dwarfed tree with comparative ease." Mr. Kenjii givees easily followed explanations and instructions on training plants in the bonsai manner. An interesting section is the "Guide to 50 Popular Species of Bonsai Trees," under which information is furnished on common English names and scientific names, fertilization, wiring, pot soil, watering, sprout, nippings, pruning, transplantation, notes.

Mr. Kenji is the author of other books on the subject and owner of Kojuen, a bonsai business enterprise, which he inherited.

BONSAI—MINIATURE POTTED TREES. Kyuzo, Murata. 114 pages, illustrated (part color). Japan Publications Trading Co., Rutland, Vt. 1965. $5.50.

Here is another informative book for amateurs by an expert who has devoted the greater part of his life to the art of bonsai and has contributed much to its advancement as proprietor of the Kyukaen Bonsai Garden, as "Highest Counselor to the Japan Union of Bonsai Growers," and as chairman of the Steering Committee of the Kokufu Bonsai Association.

DWARF TREES IN THE JAPANESE MODE. Argall, Phyllis. 145 pages, illustrated. The Citadel Press, New York, N. Y. 1964. $3.95.

Miss Argall assembled much of the material for this book during the twenty-five years she lived and worked in Japan. She interprets for the American novice in this art the mystique and technique of the dwarfed tree. Interwoven with "how to" instructions is information on Japanese history and culture, which "makes meaningful this imitation of nature, perfected in miniature."

GARDENING

CARIBBEAN GARDENING. Webster, Aimee. 138 pages + XXI, illustrated, indexed. Edwin A Menninger, American Distributor, Stuart, Fla. 1964. $2.80.

The author, who is garden editor of the Jamaican *Sunday Gleaner*, has written this book as the result of four years of research on the flowers of this area. It is divided into two parts —the first being devoted to soil, insect pests and diseases and their control propagation, roses, orchids, hedges and lawns, month by month tasks, etc.; the second to a "Glossary of Caribbean Plants," useful not only to Caribbean gardeners but to gardeners elsewhere who grow "tropical and tropical-tolerant plants."

Rather unusual to find advertising in a book —but pages I-XXI carry a number of diversified advertisements.

THE AMERICAN HOME GARDEN BOOK AND PLANT ENCYCLOPEDIA. Editors and Staff of the American Home. 512 pages, illustrated (part color), indexed. M. Evans & Co., Inc. New York, N. Y. 1963. $7.95.

The Garden Book gives a broad coverage on garden subjects—soil, annuals, biennials, perennials, trees, shrubs, vines, ground covers, lawn, house plants, plant propagation, pruning, and so on—while the Plant Encyclopedia furnishes concise descriptions of some twenty-five hundred garden plants.

MISCELLANY

THE AUDUBON FOLIO. Dock, George Jr. 30 color reproductions, accompanied by 32 pages of text. Harry N. Abrams Inc., New York. 1964.

The full-size color reproduction of thirty of Audubon's great bird paintings are contained in one folio, approximately fourteen inches wide by seventeen inches deep; the text in a separate folio ten inches wide by fourteen inches deep.

Mr. Dock has written an interesting commentary on Audubon, and this is followed by descriptions of the thirty bird paintings.

AAAS SCIENCE BOOK LIST FOR YOUNG ADULTS. Deason, Hilary J. (compiled under direction of). 250 pages, indexed. (by author and by title.) American Association for the Advancement of Science. 1964. Cloth $3.50, paper $2.50.

This replaces the Science Book List, published in 1959 and now out of print. All the books listed in 1959 were re-evaluated, some omitted entirely, others replaced by revised editions, and new books added from the many published within the past five years.

VASCULAR PLANTS OF THE PACIFIC NORTHWEST, Part 2. Hitchcock C. Leo, Arthur Cronquist, Marion Ownbey, and J. W. Thompson. 597 pages, illustrated, indexed. University of Washington Press, Seattle, Wash. 1964. $15.00.

Part 2 of a five-part work (which comprises Vol. 17 of the University of Washington

Publications in Biology) covers the *Salicaceae* (Willow Family) through the *Crassulaceae* (Stonecrop Family). It presents keys to genera, species, and infraspecific taxa; furnishes brief geographical, ecological and horticultural notes; and includes one to several drawings of each species.

Part 5, *Compositae* was published in 1955; Part 4, *Ericaceae*, in 1959; Part 3, *Saxifragaceae* to *Ericaceae* in 1961. Part 1 will not be forthcoming for another year or more.

HOW TO KNOW THE FRESHWATER ALGAE. Prescott, George W. 272 pages, illustrated, indexed. William C. Brown Company Publishers, Dubuque, Iowa. 1964. Spiral $3.00, cloth $3.50.

This is a revised edition, new genera having been added, making it larger and more complete than the first, published in 1954. *How to Know the Freshwater Algae* is one of the Pictured-Key Nature Series.

CURARE: ITS HISTORY AND USAGE. Thomas K. Bryn. 144 pages, illustrated, indexed. J. B. Lippincott Co., Philadelphia, 1964. $6.50.

A well-documented and readable account of this remarkable drug from its use as an arrow poison by the Indians of the Amazon to its present-day utilization in medicine. In the two introductory chapters the author, who is a practicing anaesthetist with a keen interest in medical history, gives a concise account of the earliest descriptions of South American arrow poisons, notably those contained in the writings of Pieter Martyr, Sir Walter Raleigh and Nicholas Monardes, followed by a survey of the investigations of curare in the eighteenth and early nineteenth centuries by Schomburgk, de la Condamine, Waterton, and others. He then turns to the problems of the botany of the curares and describes recent researches on the two main plant groups which produce the curare alkaloids—the large genus *Strychnos* of the *Loganaceae* and *Chonodendron* of the *Menispermaceae* or Moonseed Family. The next two chapters contain up-to-date accounts of the chemistry and physiology of the curares, and the book concludes with a discussion of their uses in the treatment of tetanus and as relaxants in anaesthesia. This comparatively slender volume contains a wealth of clearly presented material on this lethal drug. It is illustrated by well-chosen photographs.

ECOLOGICAL GENETICS. Ford, E. B. 335 pages, indexed, bibliography. Distributed by John Wiley & Sons, Inc., New York. 1964. $7.75.

Written for advanced students and research workers, this important and authoritative book provides an introduction to the experimental study of evolution and adaptation and to the remarkable advances which have been brought about by the combination of field work and laboratory genetics. By utilizing the techniques of this method, as developed by the pioneering researches of the author and his co-workers during the past forty years, it has been shown conclusively that evolutionary change taking place under natural conditions can be observed and that organisms may sometimes adapt themselves very rapidly to a changed environment. The author is Professor of Ecological Genetics in the University of Oxford.

PROJECTS: BOTANY. Stone, Doris M. 250 pages, illustrated, indexed. Washington Square Press, Inc., New York, 1964. Paper 60 cents.

An informative and stimulating approach to plant science through simple experiments. This inexpensive and well-produced paperback covers the major areas of the subject—the physiological processes of the green plant, growth regulators, reproduction, genetics and plant breeding, etc.—with each topic exemplified by experiments which can easily be carried out by anyone and with a minimum of equipment. The experiments are carefully described step by step and are illustrated by good line drawings. The author writes in a clear, concise style; her book will welcomed by students and science teachers, and by many amateur botanists as well.

THE INTELLIGENT MAN'S GUIDE TO THE BIOLOGICAL SCIENCES, and THE INTELLIGENT MAN'S GUIDE TO THE PHYSICAL SCIENCES. Asimov, Isaac. 402 and 400 pages respectively, illustrated. Pocket Books, Inc., New York. 1964. Paper 95 cents each.

These companion volumes by a man who is at once an outstanding biochemist and one of the most highly regarded writers in the field of scientific journalism provide a broad review of the entire spectrum of the biological and physical sciences. Written in a clear, readable style, these books constitute by far the best available introduction to the main areas of modern scientific thought for the general reader. They were originally published in 1960 by Basic Books, Inc.

HUNGER SIGNS IN CROPS. Sprague, Howard B. (ed.) 461 pages, illustrated (part color), indexed. David McKay Company, Inc., New York, N. Y. 1964. $15.00.

Much has been learned about the malnutrition of plants—why they starve, what nutrient deficiencies may be lacking in particular crops such as cotton, tobacco, potato, forage grasses, fruits, nuts—since the first edition of *Hunger Signs in Crops* appeared in 1941 and the second edition in 1949. Both were published under the auspices of The National Fertilizer Association and The American Society of Agronomy, which have transferred their copyrights to the above-named commercial publisher.

This third edition reflects the research discoveries and scientific developments in crop nutrition during the past fifteen years. The contents have been ably updated and expanded by Dr. Sprague, Professor and Head of the Department of Agronomy of Pennsylvania State University.

HORMONAL CONTROL OF PLANT GROWTH. Parihar, N. S. 144 pages, bibliography, indexed. Taplinger Publishing Co., New York, N. Y. 1964.

The response to the first (1961) edition of this monograph was so favorable that this second was published three years later. A new chapter, "Hormonal Control of Sexuality," and an index have been added.

TIME AND THE RIVER FLOWING—GRAND CANYON. Leydet, Francois. 176 pages, illustrated, color. Sierra Club, San Francisco. 1964. $25.00.

Well-composed text, superb illustrations, and appropriately chosen quotations make up a stunning presentation of the Colorado River and the great canyon that it created.

The book was published "as a public service, through imaginative philanthropy" to inform the public of the threatened tragedy—that of the proposed building of dams in the Grand Canyon as part of the Pacific Southwest Water Plan of the United States Bureau of Reclamation, which would "end the living rivers flowing for all this civilization's time.."

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PLANT SCIENTISTS AND WHAT THEY DO. Harlan, Jack R. 181 pages, indexed. Franklin Watts, Inc., New York, N. Y. 1964. $3.95.

From his rich background of experiences in many parts of the world—Turkey, Iran, Afghanistan, Ethiopia, India, Honduras—Dr. Harlan gives a colorful account of a rewarding career in the various areas of the plant sciences. He reveals what a scientist must give to his work, what he may expect to receive from it; who should enter and what education is required to become a qualified expert.

HISTORY OF GEORGIA AGRICULTURE, 1732-1860. Bonner, James C. 242 pages, indexed. University of Georgia Press, Athens, Ga. 1964. $6.00.

In an interesting, readable account, Dr. Bonner brought to light the problems of the early land and labor systems, the passing of the Colonial cattle industry reminiscent of the later West, and the development of cotton as the stable crop, the period of soil exhaustion followed by that of soil conservation and quest for livestock and grasses. Dr. Bonner has a chapter on "Gardens and Buildings," in which he writes that "Horticultural adventures after 1840 included an interest in the vegetable garden as well as in flowers, ornamental shrubs and trees. The beautification of the homestead focused some attention on construction of better farm buildings and on the architectural design of the planter's residence."

HISTORY OF BRITISH AGRICULTURE, 1846-1914. Orwin, Christabel S. and Edith H. Whetham. 411 pages, indexed. The Shoe String Press, Inc., Hamden, Conn. 1964. $12.00.

This interesting, well-written account of the technical, economic, and social changes which occurred in British agriculture—and in that nation itself—from the repeal of the Corn Laws in 1946 to the beginning of World War I, has been prepared by two women thoroughly conversant with the subject.

Mrs. Orwin read modern history at Lady Margaret Hall, Oxford, and was Secretary and Librarian of the Agricultural Economics Research Institute, Oxford. Miss Whetham was Gilby Lecturer in the history and economics of agriculture at Cambridge University, a Fellow of Newnham College, and more recently Visiting Professor of agricultural economics at Ahmadee Bello University, Northern Nigeria.

PESTS OF FIELD CROPS. Jones, F. G. W. and Margaret. 406 pages, illustrated, indexed. St. Martins Press, Inc., New York, N. Y. 1965. $10.00.

This book, primarily for students in universities and agricultural colleges, covers the range of animal pests—birds, mammals, and nematodes, though insects are given greater emphasis. Control measures are covered, also legistration on methods of control.

PROTEIN METABOLISM IN THE PLANT. Chibnall, Albert Charles. 306 pages, indexed. Yale University Press, New Haven, Conn. 1964. Cloth $6.50, paper $1.95.

The original edition has been long out of print, so the reprinting of the Silliman Lectures Professor Chibnall gave at Yale University in 1937 is "an important event."

THE CULTIVATION OF ANIMAL AND PLANT CELLS. White, Philip R. 228 pages, illustrated, indexed. The Ronald Press, New York, N. Y. 1965. $9.00.

This second edition (the original was published in 1954) has been revised and a new chapter on "Cloning: A Special and Important Case," has been added, also new information bearing on the cultivation of plant cells. Much of the material in the chapter on "Nutrients: What One Feeds to Cells" is also new.

RICE GENETICS AND CYTOGENETICS. Chandler, R. 274 pages, tables, illustrated, indexed. American Elsevier Publishing Company, Inc., New York. 1964. $14.50.

This volume comprises the proceedings of the Symposium on Rice Genetics and Cytogenetics, held at Los Baños in the Philippines in 1963. It was sponsored by the International Rice Institute, which in turn receives support from the Ford Foundation and Rockefeller Foundation.

Since rice is the principal food of more than sixty per cent of the world's population, the findings of the symposium, especially with reference to means of improving its quality as well as quantity, are significant.

SYMPOSIUM ON RICE (CCTA) C.S.A. 109 pages. Sole U. S. Distributor: International Publications Service, New York, N. Y. 1964. Cloth $2.95, Paper $2.50.

The papers presented at the Symposium on Rice held at Conarky, Guinea, in June, 1963, are presented in this volume. Participants came from Cameroun, Congo, Ivory Coast, Guinea, Kenya, Mali, Nigeria, Sénégal, Sierra Leone, and there were observers from the F.A.O. Regional Office for Africa and the United Nations Economic Commission from Africa.

PLANTS IN PERSPECTIVE. Newcomb, Eldon H., Gerald C. Gerloff, William F. Whittingham. 218 pages, illustrated. W. H. Freeman & Co., San Francisco, California. 1964. Paper $3.75.

Described as a "Laboratory Manual of Modern Biology," this was originally prepared for a large, one-semester course in general botany. It has been revised, from time to time, to keep abreast with the changing concepts of evolution resulting from recent advances in genetics.

In addition to black and white photographs, sketches, diagrams, and tables illustrate and demonstrate points of discussion. Laboratory procedures and questions for discussions are included with each "Exercise," of which there are forty-three under such headings as "Energy: A Requirement for Life," "Photosynthetic Rate: A Simple Measurement on a Complex Process," "Mitosis and Cell Division," "Genetic Problems," and "Growth Curves."

WOOD DICTIONARY, Vol. 1. Beekman, W. Boerhave. American Elsevier Publishing Company, Inc., New York, N. Y. 1964. $20.00.

Dr. Beekman, an international timber expert and director of The Netherlands Wood Academy since 1951, has compiled and arranged, on an English alphabetical base, the commercial and botanical nomenclature of world timbers and sources of supply. This work is presented in seven languages—English/American, French, Spanish, Italian, Swedish, Dutch, and German—in accordance with certain principles proposed by UNESCO and will be valuable to all concerned with trees, forestry, timber and wood products.

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*Change in Classification

FOR TODAY'S LANDSCAPE

(Continued from page 94)

MEDIUM SHRUBS
Viburnum carlesi
flowering quince *(Chaenomeles)*
bottlebrush buckeye *(Aesculus parviflora)*
hydrangea 'Hills-of-Snow'
single kerria *(Kerria japonica)*
jetbead *(Rhodotypos tetrapetala)*
oakleaf hydrangea *(H. quercifolia)*
regel privet
winter honeysuckle
Euonymus alatus

SMALL SHRUBS
Euonymus alatus compacta
abelia
Euonymus kiautschovica
Viburnum opulus nanum
Cotoneaster apiculata
dwarf artic willow
alpine currant
barberry 'Crimson Pygmy'
Deutzia gracillis
Stephanandra incisa crispa

LARGE EVERGREENS
Scots pine *(Pinus sylvestris)*
Austrian pine *(P. nigra)*
white pine *(P. strobus)*
red pine *(P. resinosa)*
Colorado blue spruce *(Picea pungens glauca)*
Norway spruce *(P. abies)*
Ketleer juniper *(Juniperus chinensis keteleeri)*
Japanese yew *(Taxus cuspidata capitata)*
other pines and junipers
non-evergreen conifers—
(Larix, Taxodium distichium, Metasequoia)

MEDIUM and SMALL EVERGREENS
Swiss mountain or mugo pine *(Pinus mugo)*
Taxus cuspidata nana
Taxus media wardii
Taxus baccata repandens
Taxus baccata aurea
Taxus media hicksii (easily kept low as hedge)
juniper 'Andorra'
other junipers
other low yews
miscellaneous dwarf forms of evergreens

BROADLEAF EVERGREENS
bull bay *(Magnolia grandiflora)*
American holly *(Ilex opaca)*
Burford holly *(Ilex cornuta burfordii)*
leatherleaf viburnum *(Viburnum rhytidophyllum)*
inkberry *(Ilex glabra)*
mahonia
pyracantha
box *(Buxus)*
Ilex crenata varieties
pieris, rhododendrons, mountain-laurel, subject to soil conditioning

GROUND COVERS
hardy English ivys
pachsyandra
myrtle
Euonymus coloratus
euonymus 'Emerald Cushion'
other varieties of euonymus
ajuga
liriope
Christmas-fern *(Polystichum acrostichoides)*
Miscellaneous perennial ground covers

THE GARDEN GOES TO A PARTY

with Staff Photographer WALTER SINGER

Ambassador of the Republic of Guatemala to the United Nations, Sr. Humberto Vizcaino-Leal, greets the more than eight hundred members of The New York Botanical Garden and their friends at Members' Evening in Essex House this spring.

Motion pictures, colored slides, and prominent speakers deeply absorb the capacity crowd, including (front row right) NYBG President Charles B. Harding, who opened the program, and Mrs. Harding.

Water colors of Guatemalan wild flowers by Mrs. Caroline R. Chickering draw admiring attention from Mrs. Herman D. Ruhm, Jr., and Charles L. Stillman. The twenty-five watercolors reveal a Guatemalan flora of exciting color.

Only an orchid of enchanting beauty could bring such sparkle to feminine eyes, those of Mrs. Clifford D. Mallory (left) and Mrs. Leighton H. Coleman. Horticulturist Louis Politi displays the plant, a rose-purple *Cattleya skinneri*, from the exhibit of living Guatemalan plants. In photo at right, Mrs. Fred Oettinger examines the plant exhibit. The national flower of Guatemala, *Lycaste skinneri*, is at center.

Silver bowls from Spanish Colonial Guatemala gleam in the handicraft exhibit, which also includes hand-loomed fabrics in Indian patterns. Intently interested above are Mr. and Mrs. William F. Wilkinson and, photo left, Mr. and Mrs. A. W. Keuffel, Mr. and Mrs. Roland Boggs, and Mrs. Wesley Boone. The Chickering watercolor display is at the far end of the exhibit area.

Speaker of the evening, Dr. Wilson Popenoe, and Dr. Bassett Maguire (NYBG Curator and Coordinator of Tropical Botany) laugh over tropical exploration anectodes.

Appetizing assortments of canapes after the program lend a tasteful climax, appreciated above by Mr. and Mrs. T. Springer (left), while, photo below, both good coffee and good conversation bring smiles as Mrs. William C. Steere pours coffee for Mrs. Eugene Detmer. Coffee was poured from other samovars by Mrs. John D. Beals, Mrs. Percy L. Douglas, Mrs. James C. Mackenzie, Mrs. Hermann G. Place (Vice President of the NYBG), and Mrs. John L. Senior.

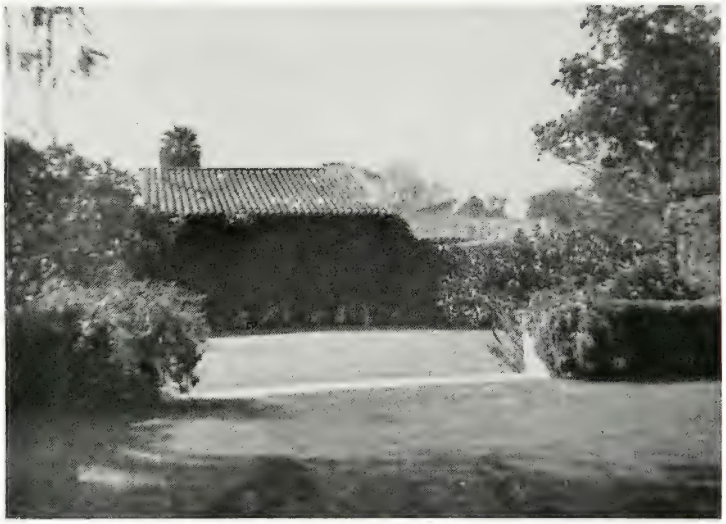
The six-man marimba orchestra's pulsing rhythms make an irresistible appeal to the dance for Bernice Winkler and Jose Tagorda. The marimba player is Guatemalan and most other members of the unit, Latin-American.

THE GARDEN'S GUATEMALA TOUR

Photographs by Mrs. Leighton H. Coleman

The Garden's Guatemala Tour, October 22 - November 6, 1965, will visit outstanding private homes, gardens, and estates, wilderness areas and principal scenic zones in the Central American republic. The group will be escorted by leading botanists and horticulturists. Price for the fifteen-day tour, including air and ground expenses and $400 tax-exempt donation to the Garden, is $1198.

TWO GUATEMALAS, of romantic Spanish Colonial architecture and of the unchanging Maya Indians are captured in these photographs, taken near Antigua. At left, a seventeenth-century church with its ornate Churrigueresco style, evocative of both Spanish and Moorish past and, at right, an Indian market with its ancient customs, colorfully garbed tradesmen, exotic fruits, and unique handicrafts.



STILL ANOTHER GUATEMALA, that of Spanish-influenced, yet modern and sunny, garden-centered living, is typified by this residence of Mr. and Mrs. Charles L. Stillman in Antigua. At right, the Volcano Agua can be seen cloaked by clouds in the distance. At left, Guatemalan orchids, flowering with blooms both delicate and vivid, grow on a tree in the Stillman garden.

MAYAN GUATEMALA'S ancient past is still being uncovered in the rain forest at Tikal. Above, the Temple of the Great Jaguar and, at right, ruins being restored. Tikal was the center of the largest city of the Old Empire. An excursion group from the Garden's Guatemala Tour will visit the ruins and surrounding jungles.

Angel's Trumpet Tree, *Datura candida*, flaunts foot-long, fragrant, white cornucopias on mountainsides where the treelike herb has gone native. Indigenous to Peru, it is one of many handsome flowering plants from outside Guatemala which have added loveliness to an already rich flora. The giant palmate leaves, at right, are those of a *Cecropia mexicana*, a tree which grows wild along Guatemala's Pacific Highway. Cecropia leaves are often sold for use in flower arrangements.

Photos by Phil Clark

Plant authorities for the Guatemala Tour will include Dr. Wilson Popenoe, horticulturist from Guatemala, left, and Dr. William C. Steere, Director of The New York Botanical Garden, shown swapping jokes about previous trips together in the Central American Republic. Other New York Botanical Garden leading lights will be among the Tour specialists—one to twenty tourists. Plans are to include a young botanist from the Pan American School of Agriculture in Honduras.

Photo by Walter Singer

Prosperity is the theme of Guatemala's booming economy these days, and new and interestingly modern architecture is beginning to transform the appearance of the little republic's capital city. The country's major crop, coffee, last year earned about $134 million—a thirty-five per cent increase over 1962. In the same period the gross national product rose seven per cent to a high of $1.2 billion, and savings deposits in the country are at record highs. A flood of United States investment has been flowing into the promising economic and political climate, including Arrow Shirts, Colgate-Palmolive, and General Mills among the newcomers.

Photo by Centro Guatemalteco de Turismo.

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THE NEW YORK BOTANICAL GARDEN

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THE GARDEN JOURNAL

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ONE VIEW OF BRITISH GARDENING IN THE EARLY NINETEENTH CENTURY

by VERNON T. STOUTEMYER

Dr. Stoutemyer has been at the University of California, Los Angeles, nineteen years; during eighteen of these years he served as Chairman of Floriculture. His principal research interests have been in juvenility and rejuvenescence of plants and in experimental plant propagation. Dr. Stoutemyer has been a Visiting Research Associate at The New York Botanical Garden for six months this year, working on plant juvenility with Dr. William J. Robbins, Director Emeritus, at the Garden and also at Rockefeller Institute.

GOLDEN AGES of horticulture have occurred in various periods and countries, usually in association with peace and political stability or colonial expansion and foreign exploration. Often notable achievements in gardening have been attained under somewhat aristocratic or feudalistic political and social regimes, with abundant labor available at low cost.

Undoubtedly, one of these periods was the early nineteenth century in Great Britain, particularly after the close of the Napoleonic Wars. The industrial revolution was well under way and was ushering in an age of prosperity. The great country houses of the landed gentry of the British Isles were flourishing establishments, with large retinues of servants and gardeners. A generation of highly accomplished landscape architects had renovated many of these great estates in an effort to fuse houses, gardens, meadows, and forests into a harmonious whole.

With the development of the great sea-faring British Empire, an increasing stream of seeds, cuttings, and plants flowed back from the frontiers to the mother country. Oriental, Australian, and South African plants began to fill the glasshouses and conservatories. The relatively primitive heating arrangements of the period were apparently advantageous in holding some of these exotic plants, which tended to disappear with improvements in methods of heating glasshouses.

The science of botanical classification was becoming established on a new and definitely modern basis. Well-illustrated botanical books and journals appeared. Great plant collections were started—many of these would be difficult to maintain under the economic conditions of the present day. Possibly much of the keen interest in gardening which persists to this day in Great Britain traces back to this period when the great estate gardens were the leaders in gardening and horticulture for a full century.

Some of the literature enables us to reconstruct a picture of the horticulture of the period. An interesting example is a book written in 1840 by Samuel Hereman, assisted by an unidentified nobleman's gardener and published by T. M. Cradock of Paternoster Row in London. The book bears a formidable title, as shown in the accompanying illustration. The dedicatory page is equally grandiose. It, too, is reproduced, together with the frontispiece.

The author's preface is dated at Narrow Water, March, 1840. The announced aim of the volume is quite misleading, since the bulk of the material deals with plant propagation and culture. Nevertheless, some important insects are illustrated with hand-colored engravings and their life histories described in detail, together with the somewhat primitive and inadequate control measures of the time. The treatment of plant diseases is much less satisfactory, and we are forcibly reminded that plant pathology is indeed a very new branch of plant science. The idea of specific pathogens for diseases of both plant and animals developed very late. Also, at the time, there was apparently a tendency to confuse the final results of insect attacks and diseases.

The senior author of the book, Samuel Hereman, was for almost forty years a literary secretary to Sir Joseph Paxton, as we learn in the posthumous 1868 edition of Paxton's Botanical Dictionary, which was supervised by Hereman. Since Paxton became superintendent of the notable gardens and conservatories of the Duke of Devonshire at Chatsworth, England, in 1826, we may assume that the association of the two men began at approximately that time.

Samuel Hereman must have played an important part in the drudgery of preparation of the first edition of the im-

Title page.

BLIGHT ON FLOWERS;

OR

FIGURES AND DESCRIPTIONS OF

THE

INSECTS

INFESTING

THE FLOWER GARDEN;

INCLUDING VARIOUS MEANS FOR DESTROYING THOSE WHICH BY THEIR DEPREDATIONS OCCASION MANY OF THE

DISEASES OF PLANTS.

ALSO,

COPIOUS DIRECTIONS FOR THE SUCCESSFUL MANAGEMENT OF ALL KINDS OF FLOWERS, WHETHER IN THE

HOTHOUSE, GREENHOUSE, OR OPEN AIR.

ILLUSTRATED WITH SEVENTEEN PLATES.

BY SAMUEL HEREMAN,

Assisted by

A NOBLEMAN'S GARDENER

LONDON

T. M. CRADOCK, PATERNOSTER ROW.

Frontispiece and dedicatory page.

TO MRS. HALL,

WHOSE

GENERAL BENEVOLENCE,

EXCELLENT TASTE IN GARDENING,

AND KIND PATRONAGE OF WHATEVER IS LIKELY TO PROMOTE THE

INTERESTS OF HORTICULTURE IN IRELAND,

ARE RECALLED BY FEW,

THIS FEEBLE ATTEMPT,

TO POINT OUT SOME OF THE MANY

CAUSES OF FAILURE

IN THE

CULTURE OF FLOWERING PLANTS,

WITH THEIR REMEDIES,

IS, WITH GRATITUDE AND RESPECT,

HUMBLY DEDICATED,

BY HER MOST OBEDIENT SERVANTS,

THE AUTHORS.

portant Botanical Dictionary, which appeared in the same year, 1840, under the joint authorship of Joseph Paxton and the famous botanical and horticultural authority, Professor John Lindley. The preface indicated that the objective was a small, portable book providing essential botanical information on any plant which would be encountered in plant collections or at horticultural exhibitions. Considerable information on propagation and culture was given in brief form for many of the entries.

Since the two books bear the same date, we may assume that there were common sources for the botanical and horticultural information in both. However, there are some distinct differences. The alphabetical arrangement of Paxton's Dictionary provides a rigid structure and systematic organization of the book. Hereman's book is very loosely, even chaotically arranged, although several indices are provided. Both the nature and the arrangement of the material suggest strongly that the contribution of the anonymous nobleman's gardener may have been quite large. The book has the flavor of authenticity; the information appears to come directly from the potting shed, the glasshouse, and the nursery. The anonymous gardener could have been one of those on the staff at Chatsworth, or he could have been in the employ of the Mrs. Hall to whom the book was dedicated. Some references to Ireland make the latter suggestion plausible. At any rate, they were doubtless the personal notes of a gardener on some estate where a large amount of plant introduction and testing were being done.

One very striking difference between Hereman's book and the several editions of Paxton's Botanical Dictionary is that the long lists of plants in Hereman's book, which are classified according to recommendations for propagation, contain many plants which either were not listed in the Dictionary or, if listed, were described botanically without information on propagation or culture. Probably many of the plants in these lists had been introduced and grown occasionally for observation but did not actually become established in the horticultural trade.

The orientation of Hereman's book toward the needs of the estate gardener is shown by the inclusion of sections on such subjects as flower gardens, shrubbery, lawns, walks, rustic ornaments, grottos, fountains, and of a gardening calendar for the year. The growing of grapes and pineapples under glass is mentioned, and bills of materials for glasshouses for these and other purposes are given. There are long lists of recommended plants for the various types of conservatories in vogue at the time, including such classes as palms, orchids, ferns, water plants, and succulents. The chief varieties of camellias then available are described, and we learn that the prices of these ranged from three shillings and sixpence to twenty-one shillings, which probably indicates both scarcity and a keen interest in these plants.

The recommendations for pest control make us aware of the decidedly primitive states of economic entomology and of plant pathology at the time. Nevertheless, some of the treatments are not entirely obsolete. We learn that sulfur was used for mildew and that certain insects were controlled by fumigation with tobacco. We are given various recipes for the preparation of insecticides. Apparently named after their originators—Millar, McMurtrie, Baldwin, Nicol, and Griffin—these were infusions or emulsions having such ingredients as tobacco, camphor, turpentine, nux vomica, oil, soap, lime, and sulfur. Toxic aftereffects were evidently a serious problem. Plants were often placed in the shade after treatment to reduce injury.

A live toad was recommended to be kept in the green-

house for the control of woodlice (sowbugs). Baiting and trapping were also recommended for these and for such pests as earwigs and wire worms.

A claim was made for one of the formulas which foreshadows the use of the relatively new systemic insecticides. Hereman wrote, "It matters little whether this ever touches the insects or not, it is received into the constitution of the plants and thus the food of the insect is rendered poisonous: and we have invariably found that the insects immediately die."

Much of the book consists of directions for the propagation of an amazingly long list of plants, mainly tropical and subtropical, with special attention to groups such as the *Proteaceae* and orchids. The plant lists are grouped in different categories according to recommended methods of propagation. If cuttings are appropriate, we are told whether they should be of ripened, half-ripened, or of young wood. The plants are further subdivided into those which should be placed in heat initially and those which should be started at lower temperatures. A further recommendation is on the basis of the rooting medium. Sand was much used, but some plants were apparently potted directly into small pots of soil. One of the inadequacies of this information is that only genera appear in the lists, and plant propagators know that certain species have their own peculiarities of behavior, either with seed or vegetative methods of propagation. The authors recognized this and attempted to remedy the deficiency by appending detailed recommendations for some of the plants.

Several questions arise regarding the validity of the information on propagation. First of all, in view of the many rare plants listed, one may question the accuracy of some of the botanical names. My own inclination is to consider them to be generally reliable in view of the association of Hereman with Paxton and Lindley. The latter was a leading botanist of the time. Further assurance is given by the directions on pages 214 and 215 for the preparation of herbarium specimens and their protection from the depredations of insects.

Plant propagators today would doubtless consider cuttings of some of the South African and Australian plants on the list to be difficult to root. Several factors may have aided the gardeners of that period. Probably most of the introductions had been by seed and the stock plants may have been quite young and in the juvenile stages of growth, which are always favorable for the rooting of cuttings.

Stock plants of the tender species would have to be grown under glass, and this likewise would tend to favor the rooting of cuttings. The better gardeners of every period have always been good observers and much given to experimentation. These lists most likely represent records of successful methods for the propagation of new plant introductions.

Among the cuttings which were made with ripened wood, and not plunged in heat, were members of the *Proteaceae* and some conifers. Young cuttings, with avoidance of heat, were recommended for *Erica, Epacris, Diosma, Cyrilla,* and many others. Heat, with varying types of wood. was recommended for the majority of cuttings.

This information possibly reflects a general principle of propagators in this particular horticultural tradition that inactive or dormant cuttings should be given a chance to callus and root before being forced under heat or at least before bottom heat is applied freely. On the other hand, actively growing plants should be given bottom heat immediately. The lists of Hereman are admittedly weak on

Euphorbia jacquiniflora and *Jasminum sambac* left, and *Jasminum wallichianum,* right, from the nineteenth-century book *Blight on Flowers.*

indications of the most favorable time of year for taking the cuttings, which is sometimes a critical factor in success.

There has been a strong revival of interest in the art of plant propagation in recent years, including the formation of an international society devoted to the collection and dissemination of information on the subject. I seriously urge that where practicable the recommendations of this and similar books be systematically tested, using the vastly improved modern equipment and controls. We must recognize that the world of exotic plants of today is in some respects a simpler one than that of a century ago, in spite of much activity in plant introductions. Many plants which could formerly be found in plant collections have become rare or impossible to find. Probably many of the plants in Hereman's book were collector's items rather than truly worthy ornamentals. This is suggested by the failure of many of the plants to obtain a listing in the later editions of Paxton's Botanical Dictionary. There would be little point to the reintroduction of these species. With the wholesale destruction of native vegetation in many parts of the world, particularly in the tropics, the burning question is whether or not these plants will have a chance to survive in their native habitats.

Scientific advances in pest control, growth regulation, plant nutrition, and herbicides have revolutionized horticulture and all other phases of plant growing. The methods described in old gardening books often seem primitive indeed. However, when we read of the great gardens, plant collections, and exhibitions of the not too distant past, we are humbled and must question if all the changes of our own century truly represent progress as far as ornamental horticulture is concerned.

PLANT LORE OF A MIDSUMMER-NIGHT'S DREAM

By Dora A. Hicks

Dr. Hicks, who is a professor in the Department of the Professional Curriculum, College of Physical Education and Health, University of Florida, Gainesville, studied botany at The University of Texas where she was privileged to be closely associated with Dr. B. C. Tharp and Dr. Marie Morrow, among others. She also knew the late William A. Murrill, who went to Gainesville several years after his retirement from The New York Botanical Garden in 1924. There he became a favorite of faculty and students alike, a stimulating conversationalist with everyone with whom he came in contact.

The following article is reprinted with the author's permission and that of *Turtox News*, in which it was published in January and February, 1965.

PART I

Shakespeare's knowledge of botany in general is profusely alluded to in *A Midsummer-Night's Dream*. Some critics are prone to think that Shakespeare created names for a few plants he mentions, or that he has reference to other plants. This is erroneous, for every plant, tree or shrub mentioned in this play grew near his home. On account of later classifications, we have to use good judgment as to the scientific names of a very few of them, but the majority are identical with today's classifications.

It has been said that the main sources of *A Midsummer-Night's Dream* were gathered from Shakespeare's playfellows in the woods and fields about Stratford. Naturally, this atmosphere inspired him to include it in this play. Flowers were closely associated with fairies. . . The English country people were fairy-loving and fairy-believing. Fairy pranks and fairy superstitions were popularly discussed. Thus our interest in flower superstitions and other curious plantlore cannot be neglected in the study of *A Midsummer-Night's Dream.*

By the use of fairy lore the plot of the play is strikingly affected. Without the use of plant lore the outcome of the fairy plot is decidedly impossible. . . .

"Yet mark'd I where the bolt of Cupid fell.
It fell upon a little western flower,
Before milk-white, now purple with love's wound,
And maidens call it love-in-idleness."

When Oberon, the King of Fairies, speaks the above lines to Puck (II, i, 165-68), he is describing the most sig-

Rosa rubiginosa.

nificant flower of the play. From its juice, a purple dye, fairy magic, and flower magic cause the plot to be extremely complicated. Oberon says (II, i, 170-73):

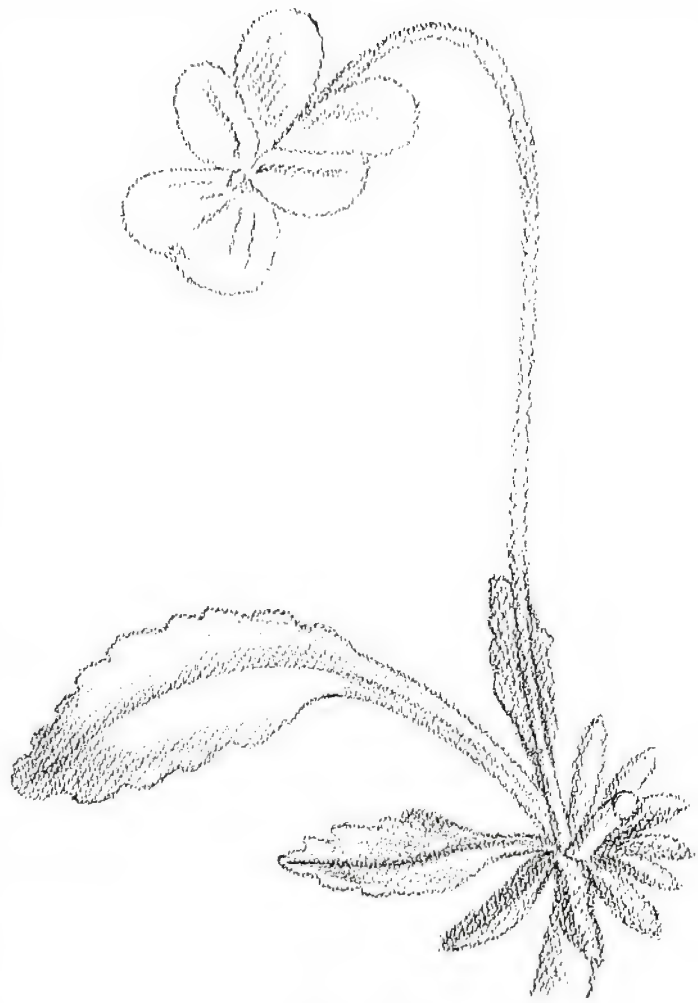
"The juice of it on sleeping eyelids laid
Will make or man or woman madly dote
Upon the next live creature that it sees."

In relieving himself of the task of applying this juice to Demetrius' eyes, Oberon is responsible for Puck's mistaking Lysander for Demetrius. Before they finish their pranks, love-in-idleness is applied to Queen Titania, Demetrius, and Lysander. Love-in-idleness is our common pansy or heartsease *(Viola tricolor).* The plant is small, being four to ten inches high. The flowers are large, purple, whitish or yellow. Purple is the usual predominant color as Shakespeare tells us through Oberon. It is an annual, growing from May to September. The pansy is a development from the violet, and according to an old German tale, it once had as fine a perfume as the violet. Since it grew wild in the fields, people very enthusiastically sought it and trampled grass which was needed for cattle. Realizing the damage being done, this flower prayed to the Trinity to remove its sweet odor, so that people would no longer seek it. The prayer was granted and the flower took the name of trinity. Later it became known as the flower of Saint Valentine. Pansy is our way of saying pensée, a thought. Other odd names for Shakespeare's love-in-idleness are Cupid's flower, call-me, the-longer-the dearer, kiss-me-quick, pink-of-my-John, and jump-up-and-kiss-me.

The rose, so often alluded to as a symbol of beauty and grace, figures from the earliest times in the art, the traditions, the poetry of the people, and will always have its place in the legends of the saints. The Saxon peasant was sincere in his belief that when a small child died, the shadowy form of death stole from the house to the garden and there plucked a rose. According to Pliny, the rose was used for perfumes, ointments, and for making rose wine. Shakespeare's allusions to the rose are so frequent that it is impossible to state definitely the species implied. The evident genus, *Rosa,* includes flowers of pink, red, or white, all of which are borne on thorny shrubs or vines growing very abundantly in England. Musk rose, *Rosa moschata,* is frequently praised for its fragrant, white flowers. Shakespeare's mention of the rose is often directed toward his ladies. When Lysander speaks to Hermia (I, i, 128-29):

"How now, my love! why is your cheek so pale?
How chance the roses there do fade so fast?"

One of the most popular legends of the day was borrowed from the Greeks. They represented the first rose as a maid of beauty, pride, and intellect. She had been wooed by many kings, and in order to be rid of them, concealed herself in a temple of Apollo and Diana. Her lovers followed her, declaring that she should replace Diana, and set her on the pedestal by force. This so angered her brother, Apollo, that he shot sun arrows at her until she wilted. She rooted to the stone, her arms bent, and sprouted leaves; her charms were turned to roses. The relic of her pride is still to be seen in the thorn she bears.



Viola tricolor.

Blooming from May until July is a rose *(Rosa rubiginosa)* which is known as sweetbrier. Shakespeare called it eglantine as did all poets except Milton, who used the name to represent the honeysuckle. Both flowers and fruit are deep scarlet in color. The bush has many prickles, and the leaves are covered on the under side with sticky, fragrant glands which give the whole bush its familiar sweet scent. An amusing legend of France tells about the guardian saint who was bewitched in a strange, lonely land. He wandered until he came to a dense growth of prickly shrubs bearing some berries. Being very hungry, he ate some of them. He was overcome by his enchantment, for he had become a deer. He groaned in hopelessness but was comforted when a voice answered, "I am Eglantine, the king's daughter. I am to remain in the shape of a tree for seven years as punishment for my too great pride. In time, a purple rose will grow in this desert, and if you eat of it you will reassume your human form. Then you will have power to cut this tree and free me." For seven years they waited. The saint's horse found the desired flowers on a climbing shrub and took them to his master. He eagerly devoured the blossoms and slept. In the morning he arose as a man and rode to the tree where Eglantine awaited deliverance. Saint Denis severed the trunk, saved the princess, and received high honor. The rose of salvation was then named eglantine in her memory.

Eglantine has been termed somewhat carelessly as wood-

bine. The sweet-scented flowers of woodbine are yellow, pink, or white. Woodbine is very similar to our honeysuckle, but blooms somewhat earlier in the spring, and its twining habits are much more complicated. Woodbine was so-named because of its woody, binding stems.

Shakespeare's "nodding violet" still recalls fear in the hearts of old English rustics by whom it was used to guard the mourners against poisonous exhalations from the cemetery. Its color is suggested in the purple of church mourning and in the wearing of amethyst jewels by persons who are orphans or widows. Napoleon was known as Corporal Violet because this was his favorite flower. When Napoleon the Little led Eugenie to the altar, she was given a large bouquet of violets. She started to cry because it was the funeral flower, the token of ill luck. Lately, the violet has been mentioned in the alleviation or even the cure of cancer. Poultices of the leaves are supposed to be beneficial. Even in the day of Culpepper, the herbalist, it was believed that the violet would cool or relieve any swelling or inflammation. Shakespeare probably meant the marsh violet when he said (II, i, 250-51):

"I know a bank where————
————the nodding violet grows."

for *Viola palustris* is the only British violet with drooping, purple flowers and with leaves on long stalks from the root that blooms from April until July in bogs or near streams.

As Helena tells Hermia of her fairness which so attracts Demetrius and Lysander, she refers to the spring of the year (I, i, 185):

"When wheat is green, when hawthorn buds appear,
Sickness is catching: ————"

Being in love with Demetrius, she wishes some of Hermia's attractiveness to cause Demetrius to be love-sick over her. The wheat at this time of the year is a waving sea of green. The contrast with the hawthorn tree, the flowers of which appear early in May as small, pale pink buds, makes a picture soothing to the eyes of all humanity. These buds grow in numerous clusters and are very sweet-scented. *Crataegus oxyacantha* is the only British species of hawthorn. Hawthorn has received its name from "holy thorn," because it has always been associated with Christ.

Lysander further emphasizes the beauty of spring when he speaks of the bladed grass, in telling of the flight that he and Hermia have planned. When is the grass prettier than it is at this time, as the new blades sprout into a vivid and refreshing green? So is this true of the green corn about which Titania speaks.

Among the ushers of the spring, the little pink primrose keeps its popularity. It is no rose at all, but is so named through a twisting of the Italian *fiore de prima vera,* first flower of spring. Early Englishmen called it primerole. . . . It has its sentimental origin in the human creature, Paralisos, who died of heartbreak and was changed by the gods into this rustic, cheerful blossom. The primrose grows in shady places. Hermia says (I, i, 214-15):

"And in the wood, where often you and I
Upon faint primrose-beds were wont to lie,"

The cowslip and the oxlip are two small spring flowers which closely resemble the primrose, of which they are relatives. The cowslip is golden-yellow in color, with darker mottlings sometimes evident. The stalk of the flower is about ten or twelve inches high. Shakespeare gives a good description of it (II, i, 10-13):

"The cowslip's tall her pensioners be:
In their gold coats spots you see;
Those be rubies, fairy favours,
In those freckles live their savours:"

The oxlip has large, pale yellow flowers which bloom in the early spring. It is known as *Primula elatior.*

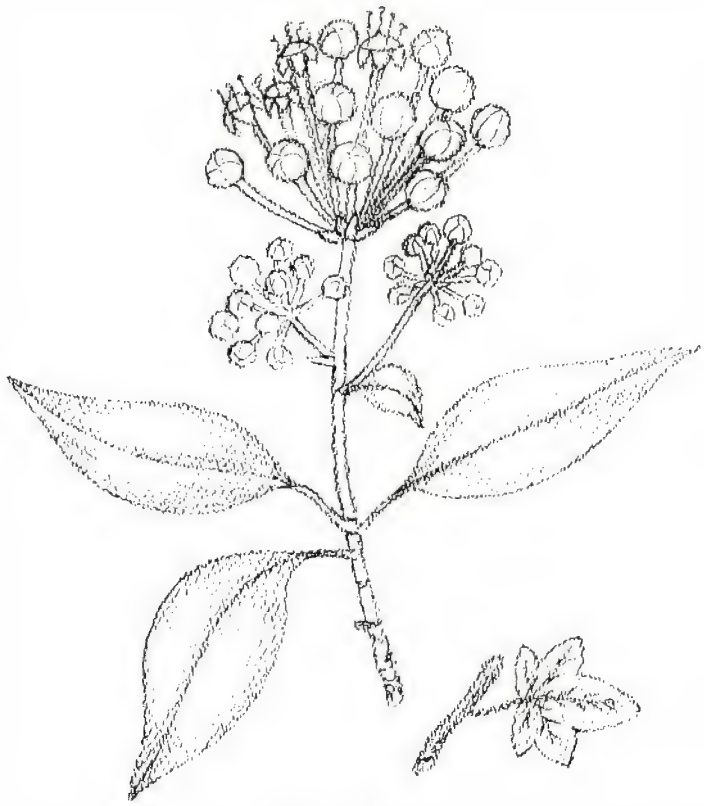
In this wood where these shade-loving primroses, oxlips, and cowslips grew, the duke's oak stood. Here the Pyramus-Thisbe play rehearsals were held. The oak is the symbol of strength, and references to it are very frequent both in poetry and in history. Other oaks grew in this wood, for Puck says of their fruits (II, i, 30-31):

"———— that all their elves for fear
Creep into acorn-cups and hide them there."

Titania, in telling Bottom how she will wind him in her arms, says (IV, i, 45-47):

"So doth the woodbine the sweet honeysuckle

Primula elatior.



Hedera helix.

Gentle entwist; the female ivy so
Enrings the barky fingers of the elm."

The ivy and the oak are supposed to represent woman and man: the oak, because of its aforementioned strength, and the ivy because of its grace, beauty, and dependence on other objects for support. Hymen's altar was decked with ivy, in token of the clinging love of woman. *Hedera helix,* the English ivy, is an evergreen vine which will climb high. The above reference to the sex of the ivy is the only evident source Shakespeare could have had for terming it female. Aristotle said that there was no distinction in the sex of plants. He knew nothing of functions of stamens and stigmas, nor did anyone until the publication of the *Anatomy of Plants* by Nehemiah Grew in 1682.

Bushes and briers constituted the underbrush of this wood, including all these wild plants of Shakespeare's botanical vocabulary. Of this thicket, Demetrius says (II, i, 227):

"I'll run from thee and hide me in the brakes," meaning these woods. Of the shrubs, Titania knows the ones beneficial for food. She, in her care of Bottom, tells her attendants to (III, ii, 169-70):

"Feed him with apricocks and dewberries,
With purple grapes, green figs, and mulberries;"

An interesting reference to the mulberry is given by Skinner, who accounts for the red color of the berry through the Pyramus and Thisbe legend. Parted by their cruel parents, the favorite tryst of the lovers was in the shade of a white mulberry tree at the tomb of Ninus. Thisbe arriving first one day was frightened by a lion coming from plundering a sheepfold, and she dropped her veil as she ran to a place of refuge. When Pyramus later discovered her stained veil, he knew that the beast had devoured her and plunged his sword into his heart. When Thisbe's fear left her, she ventured back to the tree; seeing her lover slain, she struck the steel blade into her own breast with such force that the blood spouted over the berries above her. With her last breath, she gasped, "You, tree, bear witness to the wrongs our parents have done to us. Let your berries be stained with our blood in token of their misdoing". The lovers were buried together, and since that day the mulberry has been red.

Bottom, not caring for Titania's suggestions for feeding, shows a preference for dry oats, hay, and dried peas. He knew where to find honey, though, for he tells Cobweb (III, ii, 10-13):

"——— get you your weapons in your hand, and kill
me a red-hipped bumblebee on the top of a thistle;"

It was at this time, however, that his "exposition of sleep" came upon him.

(To Be Continued)

OUR HERBAL HERITAGE

By Alice H. Williamson

Mrs. Williamson's interest in horticulture has been responsible for her etchings of trees, her great enthusiasm about herbs, and her active participation in two garden clubs. She is a former chairman of the herb herbarium that the New York Unit of the Herb Society of America maintains at The New York Botanical Garden. Her study of the history, cultivation, and uses of herbs has stimulated her interest in experimenting with these plants and in writing about them. Mrs. Williamson also acts as herb consultant in designing perennial gardens.

"Herbs?" you ask. "Oh, yes, I grow chives, dill, basil, thyme, and sage." And perhaps you use the less familiar tarragon, rosemary, and burnet in cooking, if your family doesn't object.

Why don't you try a different approach to herbs? Grow some of the medicinal plants to add color to your garden and another interest to your life. Do you know that some of the pills you take are herbal remedies which have been used ever since Dioscorides prescribed them in the first century A.D.? Do you know that your favorite perfume may have been prepared over two thousand years ago? Really, herbs have three faces: medicinal, culinary, and that of beauty.

Much of the early herb lore was communicated by word of mouth and based on legend and superstition. Herb women gathered plants in fields and woods, on days traditionally considered propitious. Among the plants used medicinally were southernwood, rosemary, lavender, maidenhair fern, hyssop, and dill. Others invoked evil spirits: vervain, betony, yarrow, hemlock, fennel, coriander, and henbane. Love philters were made from savory, balm, mint, periwinkle, houseleek, and crocus.

In the fourth century B.C., Hippocrates, the Father of Medicine, taught the value of plants for human ills in the

Temple of Healing, the sanatorium of the ancient Greeks. Four hundred herbs recommended by him are in use today.

Until modern times, botany and medicine were regarded as the same science. Theophrastus, born in 370 B.C., is called the Father of Scientific Botany. He was a pupil of Aristotle whose Lyceum he inherited. Theophrastus's manuscript, *Enquiry into Plants,* extended his influence until 1550 A.D. He compounded perfumes of our familiar beebalm, mint, lilies, iris, and sweet marjoram, and his fixatives are still used. He was the first to describe the cabbage rose, explaining that it had between five and one hundred petals. The ninth book of his "Enquiry" contains much information about medicinal plants and their uses.

The first strictly medical botanist was Pedanius Dioscorides, born at Anazarbas in Cilicia in the first century of the Christian era. He was a physician who traveled as an army doctor with the legions in his own country as well as in Greece, Italy, Spain, and North Africa. In 50 A.D., Dioscorides produced his *De Materia Medica,* a herbal which influenced the practice of medicine in Europe for more than sixteen centuries. His manuscript is the link with earlier herbal medicine, and is composed of five books of remedies covering the following catagories:

Book 1—Aromatics, Oils, Ointments and Trees.

Book 2—Living Creatures, Milk and Dairy Produce, Cereals and Sharp Herbs.

Book 3—Roots, Juices and Herbs.

Book 4—Herbs and Plants.

Book 5—Vines and Wines, Metallic Ores.

Each plant is given a complete description, including manner of growth and colors of leaves and flowers, form and flavor of roots, the best places to find superior plants, methods of keeping and preparing them for medicinal uses, prescriptions for treatment.

The first plant mentioned among the aromatics is our old friend, *Iris germanica.* "The roots," writes Dioscorides, "have a warming facultie, fitting against colds, purge, thick humors, and the drink made from them causes sleep and heals the torments of ye belly." Instructions are given for making rosaceum ointment, oils of basil, dill, southernwood, lilies, and crocus; resins from pine seeds and cones. According to Dioscorides, the value of living creatures in keeping man in good health is strange indeed. Vipers are good for the eyesight and the nerves. Dried and crushed stones of the hippopotamus are added to wine for the bitings of serpents. Perhaps this is the inspiration for our alcoholic snake-bite remedy. Milk helps inward ulcers and fats of poultry aid women's griefs, chapped lips, the complexion, and earache. Watercress stops falling hair. Rhubarb roots cure practically everything from convulsions to asthma. Sage is a wound herb. Wines are good for the stomach and for lusting women. Healing preparations described are made from all kinds of metallic stones and ores: turquoise, copper, lead, iron, and gypsum.

De Materia Medica was first illustrated in 512 A.D. As with all old medical manuscripts, it was copied by hand countless times—the work involved in rewriting is almost incredible. During the Dark Ages, most of these manuscripts were lost. But a complete codex of *De Materia Medica* was made in Byzantium early in the eleventh century, and it is now in the Imperial Library in Vienna. The Pierpont Morgan Library in New York has the only complete codex of this herbal in the Western Hemisphere.

The first English translation of the Dioscorides herbal was made in 1655 by John Goodyear who copied the Greek text, line by line. He could not find a patron to subsidize the publication of this translation, which filled six volumes, 4,540 quarto pages, so it gathered dust in the library of Magdelen College, Oxford, for almost three hundred years. In 1934 Robert Gunther discovered it, and it was published by the Oxford University Press. Anyone who is interested in horticulture as well as in medicine will find this book fascinating, for it mentions so many plants which we cherish today in our gardens.

After the fall of Rome, the only recourse to medical knowledge were the manuscripts preserved in the local monasteries.

During the Renaissance, herbals flowered with all the awakening of that period. *Banckes's Herball* and Turner's *A New Herball, Herberius zu Teutsch (Gart der Gesundheit)* and Gerard's *The Herball* were published in the sixteenth century as were the herbals of Otto Brunfels and Leonard Fuchs. John Parkinson's *Paradisi in Sole,* 1629, is said to be one of the finest garden books ever written. It describes many herbs, their cultivation and uses. Nicholas Culpepper's herbal, 1652, was a bible of medicine for many years, although it was somewhat criticized by his peers. In reading the old herbals, we are completely amazed by what we owe the men who so scrupulously noted the medicinal virtues of many plants now in use. All the old herbals, beginning with that of Dioscorides, have interesting illustrations.

No one knows how early our own American Indians made use of wild plants and trees as medicines. The Spaniard, Nicholas Monardes, in his sixteenth-century *Joyfull Newes Out of the Newe Founde Worlde,* gives an account of the Indians' knowledge of medicine. This book was translated into English in 1577. John Josselyn's amusing book of the seventeenth century, *New Englands Rarities Discovered,* tells about many Indian remedies.

Among the herbs which the American Colonists used medicinally, were anise, beebalm, betony, bloodroot, calamint, chamomile, feverfew, hoarhound, monkshood, mustard, pennyroyal, peppermint, rue, sage, selfheal, and tansy.

If you want to be very up-to-date on medicinal plants, thumb through the large volumes of the *United States Pharmocopia* and the *United States Dispensatory,* which list the plants at present officially recognized as having valuable medicinal properties.

The importance of herbs as food is almost as traditional as that of our medical heritage. The Egyptians chewed garlic and radishes for strength while they toiled at the pyramids. The Chinese ate garlic as early as 2,000 B.C. For centuries, lilies have been used as food in China.

Bible references to the humble herbs show the significance of these plants in the life of the times. Their first mention is in Genesis 1:11. Anise, mint, and rue were accepted as tithes. Saffron was praised in the Songs of Solomon. Newly slaughtered animals to be preserved for meat were rubbed with herbs. At special meals, marjoram, mint, thyme, and costmary were strewn on the bare table in lieu

of a cloth. Herb vinegars were a standard product of Old and New Testament households. First Kings tells us that herbs were more valuable than jewels. In Proverbs, we read that "A dinner of herbs where love is is better than a fatted calf and hatred with it."

Mithridates ate cakes of rue each morning to counteract poison which might have been put in his food. The Greeks called fennel "marathron," derived from their word which meant to grow thin. It must have been the "Metrocal" of the era.

Horace often mentions the herbs in his garden. He prays for olives and tender herbs from field and garden instead of for gold and ivory. His dinner invitation to Torquatus is hospitable but forthright:

> "If, my Torquatus, you can kindly deign
> To lie on beds of simple form, and plain,
> And sup on herbs alone, but richly dressed,
> At evening, I expect you for my guest."

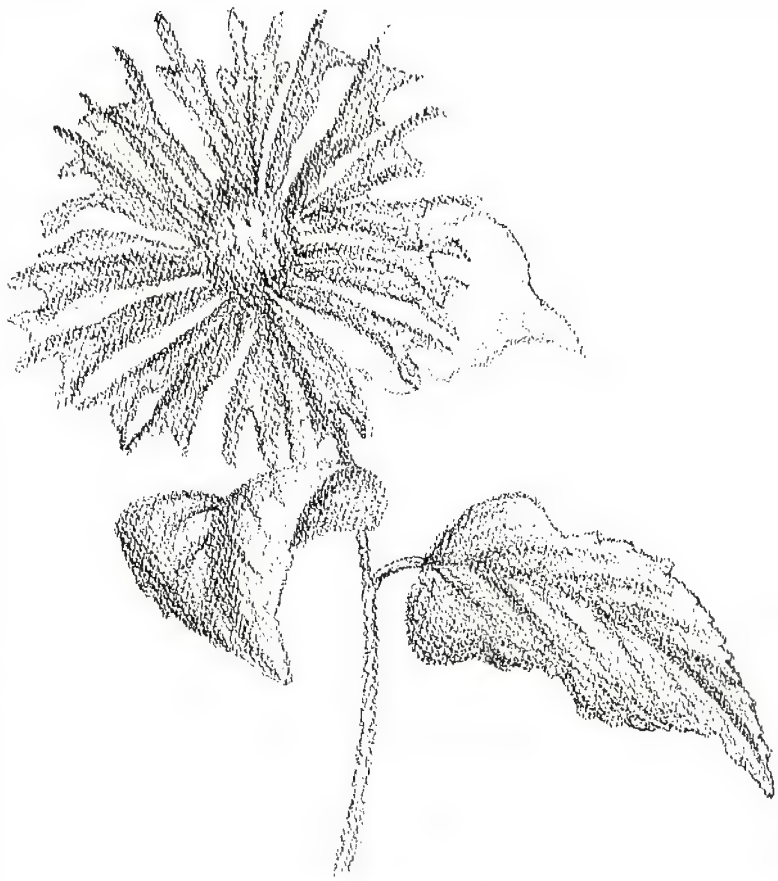
Columbus's sailors sowed borage on Isabella Island. Casanova chewed sweet herbs to perfume his breath. At the enormous banquets in the reign of Henry VIII, the gorging of food was interrupted by fencing matches and minuets, when cooling tisanes and sobering almond milk were served. John Evelyn's *Acetaria, A Discourse on Sallets,* 1699, recommends spring tansy, fried and dressed with orange juice and sugar. Here is his description of how to flavor a salad. "Every plant should bear its part without being overpowered by some Herb of stronger taste, so as to endanger the native Sapor and Vertue of the rest; but fall into places like Notes in Music, in which should be nothing harsh or grating and tho admitting some discords (to distinguish and illustrate the next) striking in the more sprightly and sometimes gentler notes reconcile all dissonances and melt them into an agreeable composition."

Every Colonial garden had its pot herbs and simples. The book, *The Williamsburg Art of Cookery,* is filled with recipes from soup to confections which include herbs. Here, too, is a list of favorite garden herbs and their uses.

Interest in herbs has been revived by many contemporary authors whose books contain innumerable herb recipes for appetizers, soup, fish, meat, poultry, vegetables, salads, bread, desserts, preserves, candies and wines. A recent book by M. A. Jagendorf, *Folk Wines, Cordials and Brandies,* has rules for making wines from angelica, lemon balm, caraway, dill, ginger, sweet woodruff, mint, parsley, sage, and pineapple sage. Angelica, anise, caraway, carnation, mint, and roses give fragrance to liqueurs and cordials.

The third face of herbs, that of beauty, has almost unlimited aspects. The concoctions of balms and elixirs, which have been used for centuries by women to lure the wary male, are an enlightening study.

Dioscorides mentions several remedies "to make the eyelids look faire." He tells how to make small, dried balls of roses, myrrh, and Indian nard "to be put about women's necks instead of necklaces, dulling the unsavourie smell of the sweat." In one of his manuscripts, Galen, born in 130 A.D., gives a recipe for a cold cream which is made today. An old book, *The Toilet of Flora,* published anonymously in London in 1775, is a gold mine of recipes for perfumes,



Monarda didyma.

potpourri, and all the fragrant preparations dear to the feminine heart. *A Plain Plantin, A Still Room Book,* 1688, gives lengthy directions for making a fine pomatum for the face and includes lily bulbs among the ingredients.

Herbs in art? More than four thousand years ago the crocus decorated a spouted pottery jug which the Bronze-Age housewife used for water, wine, or oil. During the Middle Minoan III period, from 2100-1600 B.C., lilies, crocus, and irises were painted on palace walls and on pottery. One of the frescoes at Knossos shows the earliest-known picture of a rose. Think of all the old, illuminated manuscripts! Think of the beautiful Dutch and French flower paintings! So many of our lovliest flowers are considered herbs because of their medicinal qualities; the rose, flax, calendula, feverfew, crocus, monkshood, hollyhock, anemone, myrtle, peony, lily, white and yellow pond-lily opium poppy, all are mentioned in Dioscorides' *De Materia Medica.*

Since earliest times, herbs have been used for dyes. When Caesar's Roman army invaded England in 55 B.C., they found the descendents of an ancient race of people from the Stone Age who were called "Picts" (meaning painted people) because of the colored designs on their bodies, made by puncturing the skin and rubbing woad on the abrasions. Among the dye plants of centuries are indigo, madder, anchusa, saffron crocus, safflower, wild spikenard, chamomile, gold thread, mulberry, sumac, harebell, celandine, purslane, and yarrow.

Herbs for beauty? They lend enchantment to the theatre and to poetry. We're all familiar with Shakespeare's "I know a bank where the wild thyme grows" in *Midsummer-*

Night's Dream; from *The Winter's Tale,* "Here's flowers for you, hot lavender, mints, savory, marjoram;" and from *All's Well That Ends Well,* "Indeed, sir, she was the sweet marjoram of the salad, or rather, the herb of grace." "They are not salad herbs, you knave, they are nose-herbs."

Edna St. Vincent Millay knew herbs and loved them. Read her "The Blue Flag in the Bog." Milton, Herrick, Wordsworth, Amy Lowell, and Masefield sang praises of daffodils.

Herbs for beauty? They are nearest our hearts in our gardens—from the Orient, Persia, Syria, India, from Greece at the time of Dioscorides and Galen, from Rome when Pliny the Elder, Virgil, and Horace extolled their own gardens, from the monastary gardens of the Dark Ages, the formal gardens of France, the Colonial gardens of Virginia and New England, the Victorian gardens of England to the botanical gardens of today on every continent. Try to find one of these gardens which does not have a herb plant. Our own country has many public and private gardens which are planted with nothing but herbs. Herb nurseries supply each area.

The decorative herbs are lovely in flower arrangements as well as in gardens. Plant the red and yellow yarrow, ornamental alliums, gray-leaved artemisias and hoarhound, tall angelica and lovage, white-starred winter savory, feverfew which seeds itself, blue borage and globe thistle, yellow rue, dyer's woad and costmary, red pineapple sage, purple-leaved perilla, copper fennel, sweet woodruff, chamomile and creeping thyme for ground covers, and a dozen varieties of mints.

Herbs for medicine, for food, and for beauty. You can scarcely imagine the enormous amount of information which has been written about them. It is inexhaustible—and never dull.

HISTORICAL AND CULTURAL NOTES ON CLINTONIA BOREALIS

By HARVEY SIMMONDS

Mr. Simmonds is presently taking care of the Native Plant Garden under the supervision of Louis P. Politi, Horticulturist, and Marcel Candia, Foreman.

> Clintonia borealis . . . Its beauty at present consists chiefly in its commonly three very handsome, rich, clear, dark-green leaves, which Bigelow describes truly as "more than half a foot long, oblanceolate, smooth and shining." They are perfect in form and color, broadly oblanceolate, with a deep channel down the middle, uninjured by insects, arching over from a centre at the ground; and from their midst rises the scape, a foot high, with one or more umbels of "green, bell-shaped flowers,"—yellowish green, nodding or bent downward, but without fragrance. In fact, the plant is all green, both leaves and corolla. The leaves alone—and many have no scape—would detain the walker. Its berries are its flower. A single plant is a great ornament in a vase, from the beauty of its form and the rich, unspotted green of its leaves.
>
> Henry David Thoreau
> *The Journal,* June 2, 1853

A COLONY OF *Clintonia borealis* (Ait.) Raf. in the broken light of a hemlock woodland, where the long slope of the land levels to a moist plateau before becoming lake-side, shows in the later summer days Prussian blue berries on tall stems. Clintonia and the pink lady's-slipper (*Cypripedium acaule* Ait.) are often found together, their leaves, similarly shaped and with the same habit of growth, lying close against the ground. Canada mayflower (*Maianthemum canadense* Desf.) and dwarf cornel (*Cornus canadensis* L.) may well be here; in their company the spreading clintonia rhizomes occasionally produce mats of leaves covering many square feet. Fernald (Gray's *Manual of Botany,* eighth edition) gives the range from "Labrador to Manitoba, south to Newfoundland, Nova Scotia, New England, mountains of Georgia and Tennessee, Michigan, Wisconsin, and Minnesota."

There are six species of *Clintonia,* two of them Asian, two limited to the American Northwest, and two native in the Northeast. *Clintonia umbellulata* (Michx.) Morong occurs much less frequently than *C. borealis,* from which it differs by having a denser umbel of fragrant flowers, white with green and purple markings rather than green-tinged yellow. A possible hybrid of *C. borealis* and *C. umbellulata,* with curious fruit which "when brought into sunlight . . . presents a kind of silvered bronze upon a vivid blue background" is recorded by J. F. Harned as *C. alleghaniensis.*

Clintonia borealis was first described by William Aiton in *Hortus Kewensis* (1789) as *Dracaena borealis.* The plant had been collected by Dr. Daniel Carl Solander in Newfoundland, and introduced at Kew in 1778. Solander was a close friend of Sir Joseph Banks, the renowned Director under whom the Royal Botanic Gardens at Kew established the policy of international plant collection. Aiton's report that Solander introduced clintonia to Great Britain is questionable; in the third volume of Andrews' *The Botanist's Repertory,* published some ten years later, appears the statement that "About the year 1776, this plant was first received in England, by Messrs. Lee and Kennedy from Montreal, Canada, No. America." But whether the date was 1776 or 1778, and whether the introduction was by Solander or some other botanical explorer of North America, by 1808 it had gained sufficient popularity as a

garden subject to be grown at Loddiges' Nursery in Hackney. It was from a specimen of Mr. Loddiges that the drawing used for Plate 1155 of Curtis' *Botanical Magazine* (1808) was made. Gawl's accompanying description details the taxonomic confusion which surrounded the genus. *Dracaena borealis* had been held the valid name in the 1797 edition of Miller's *Gardener's Dictionary* and Willdenow's fourth edition of the *Species Plantarum* (1799). But Michaux, traveling in the Carolinas, gave the plant we now know as *Clintonia umbellulata* the name *Convallaria umbellulata* (*Flora Boreali-Americana,* 1803). Desfontaines described this species under the name *Smilacina umbellulata,* and this served as authority for the adoption of the generic name in Gawl's comments on *Smilacina borealis* for the *Botanical Magazine.*

The establishment of *Clintonia* as the generic name fell to the extraordinary C. S. Rafinesque. His initial publication of the name *C. nutans* in the *American Monthly Magazine* (1817) was followed by reports totaling twenty additional species in the *Atlantic Journal and Friend of Knowledge* (1832) and *New Flora of North America* (1836). These have all been established as synonyms of the two species *C. borealis* and *C. umbellulata.* Rafinesque notes that the genus is "Dedicated to my friend the worthy D. Clinton a worthy Philosopher, Naturalist and Botanist as eminent as Jefferson." This renaming of the genus in honor of the Governor of New York met with something less than universal approval. Amos Eaton appended a note to the description of *Dracaena borealis* in the third edition of *A Manual of Botany for the Northern States* (1822) which appeared in all succeeding editions of the work:

> This is the *Clintonia nutans* of Mr. Rafinesque. My personal obligations to Mr. Clinton would certainly induce me to unite in any act of justice to his literary and scientific merit; but to aid in an attempt to force his name upon an old genus, would not comport with my views of propriety, and I am sure it would be offensive to him.

Thoreau, in an 1852 entry in *The Journal,* mistakenly attributing the choice of names to Gray, registers even stronger disapproval:

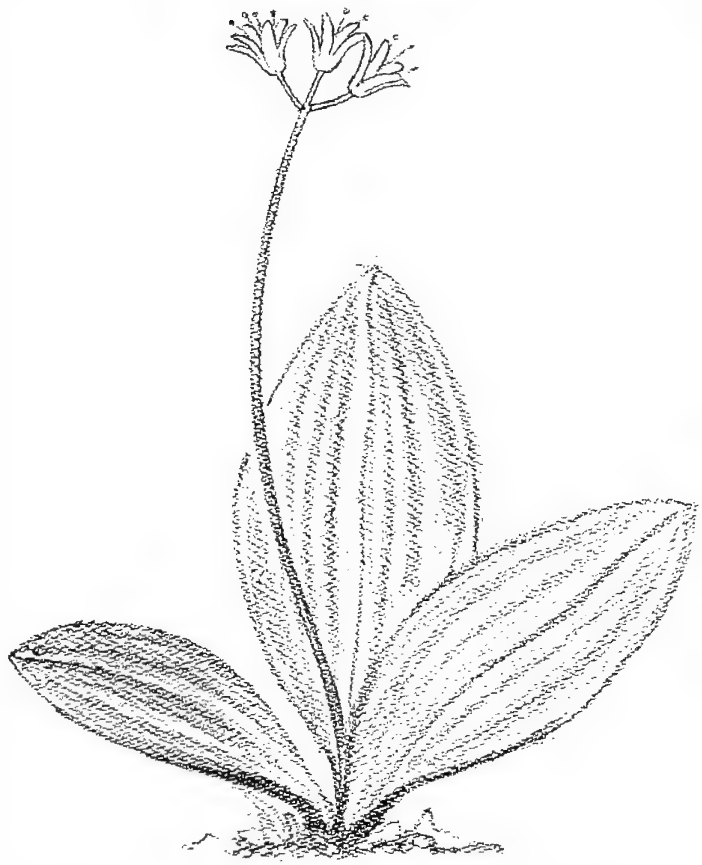
> But Gray should not have named it for the Governor of New York. What is he to the lovers of flowers in Massachusetts? If named after a man, it must be a man of flowers . . . Name your canals and railroads after Clinton, if you please, but his name is not associated with flowers.

This note of distress has been persistent in the popular literature on wild flowers, despite the fact that in *How to Know the Wild Flowers* (1893) Mrs. William Starr Dana remarked that "A letter received from Mrs. De Witt Clinton tells me that the passage does an injustice to Governor Clinton, who, it seems, was truly 'a man of flowers,' and recognized as such by the various Horticultural societies of which he was honorary member." Clinton was not only an honorary member of the Linnaean Society and the Horticultural Society of London (later to become the Royal Horticultural Society), and the New York Lyceum of Natural History; he corresponded extensively with a wide range of American, English, and continental devotees of the natural sciences. In an address welcoming the recently established New York branch of the Linnaean Society of Natural History of Paris, Clinton, speaking of natural history, commented that "the enthusiasm which I cherish on this subject, is justified and enhanced by every contemplative view and every elaborate investigation." Surely Thoreau and his followers have been unduly harsh.

The common names and properties of clintonia are even more various than those botanists have given. John Josselyn came to America from England in 1663, settled near Boston, and made journeys into the Indian country to collect plant lore. His *New-England's Rarities* was published in 1672; describing a plant which is probably *Clintonia borealis,* to which he gave the name Lily Convallie, he noted that the Indians used some unmentioned part as an ingredient in a love potion. Gawl's text for the *Botanical Magazine* supplied *alecostote* as the Indian name, presumably from information gathered in Newfoundland by Dr. Solander, and added the translation Hunter's Physic. Rafinesque reported *cuscum* as the name found among the Lenapian Indians, and Manasseh Cutler, an eighteenth-century clergyman-naturalist of eastern Massachusetts, came to know the plant as *quaffidilla.*

While some Indians apparently found useful qualities in clintonia, others regarded it as poisonous. Thoreau tells of gathering materials for herb tea under the direction of an Indian guide while traveling through the Allagash country of Maine, and being sternly cautioned against the berries of *Clintonia borealis.* More recently, Alfred Stefferud in *How to Know the Wildflowers* (1950) classifies the berries as "somewhat poisonous." At least one of the common names suggests that the berries are edible— bear's corn, as it was called by the countryman who led John Burroughs through the Kennebec Valley in Maine. Fernald and Kinsey (*Edi-*

Clintonia borealis.



ble Wild Plants of Eastern North America, 1943), after mentioning that the young leaves are useful in salads and as a potherb, add that the "berries are reputed to be poisonous, but so far as we can learn, no actual trials of them have been made."

Bear's corn, corn-lily, dogberry, bluebead-lily, and hatpin plant are names associated with the fruit borne on long stalks; straw-lily and yellow clintonia refer to the flower color; cow-tongue and bear-tongue recall the leaf shape; balsam-bell marks a favored habitat. But there is also wild lily-of-the-valley, shared with several other species, and more remarkable, dragoness plant. Where and how Amos Eaton came on this name, published in *A Manual of Botany for the Northern States,* and from what feature of the plant it derives, are mysteries.

Clintonia in the woodland garden admirably combines beauty and practicality. It is among those select species whose attraction is not limited to a single period of showy flowers or conspicuous fruit, but rather extends through all its cycle of growth. The apple-green leaves appear early in April, unrolling and deepening in color until they form a flat emerald backing for the tall scape and its umbel of pale yellow, bell-shaped flowers. These persist for two weeks or more, to be followed by the deep blue berries which often last through September. Even discounting flower and fruit, the handsome leaves provide an excellent groundcover in the late spring and throughout the summer. The plant may be propagated from seed gathered as soon as ripe and sown in protected beds, or in pans plunged in a coldframe to allow stratification. In areas where there is a great abundance, it is possible to transplant small mats of the rhizomes in the fall. It is essential in taking up the plants that the new runners with the following season's bud be included; the current season's growth dies back and will not regenerate. The area to be planted should be conditioned with peat and hardwood leafmold to approximate natural conditions, and must be in a moist, heavily shaded location. A colony is an unfailing source of quiet beauty.

THE GREAT VALLEY

By GEORGE A. ELBERT

Mr. and Mrs. Elbert, who are enthusiastic amateur botanists, lecture and write about their trips.

SALISBURY AND CANAAN, towns in the northwest corner of Connecticut, are slightly less than ten miles apart. From Salisbury, Route 41 heads north along the valley to the east of the range which includes Mt. Riga and Mt. Everett, the latter famous for its miles of mountain-laurel in bloom around May 26th every year. The route passes through the Egremonts in Massachusetts and leads into Great Barrington. From Canaan, Route 7 likewise points to this Berkshire resort town. In the triangular valley between is one of the finest places to look for wild flowers in the whole of the East.

It is not my intention, in this short space, to attempt a description of this region so much as to characterize certain aspects and to point out the wealth of fall flowers which usually receive less attention than those of spring.

The valley is a flat plain with occasional hillocks, well watered and above all, in terms of suitability to the development of many of our northern species, full of limestone outcroppings. A pretty nearby town is, in fact, called Lime Rock, and near Canaan there are a number of limestone quarries both ancient and still active. The stone is a brilliant white and, when crushed, looks like lumpy sugar. At the entrance to a quarry there is usually a pile of it from which we fill a bag for our plant trays at home. Certain areas almost as rich in wild life lie just to the east of Canaan and Barrington and deserve description at another time.

Recognition of the beauties of the valley has been general among naturalists. Just west of Sheffield, about half way between Canaan and Great Barrington, at Ashley Falls is the well-known limestone outcropping that goes by the name of Bartholomew's Cobble. It is owned and maintained by the Trustees of Reservation, an organization now almost seventy years old, to "preserve for public enjoyment beautiful and historic places in Massachusetts." The cobble has a resident naturalist-caretaker. Rich in flowers and ferns, it is a miniature which well represents the flora of the region and is a pleasant place to picnic to boot. *Liparis loiselii,* an insectile-appearing orchid, grows right near the caretaker's house, and we have seen there the yellow-flowered form of the wild columbine *Aquilegia canadensis f. flaviflora* (Tenny) Britt. Many of the rarest ferns of the area nestle in the rocks. It is the only place where we have seen all four forms of *Actaea.* This plant, better known for its fruit than its flowers, has two basic species, *A. pachypoda* (generally known as *A. alba*) and *A. rubra.* The one has thick pedicels and white berries, the second thin pedicels and red berries. *A. pachypoda* has a red-fruited form (still with thick pedicels); *A. rubra* has a white-fruited form (on thin pedicels).

Although the region of the valley that we find most rewarding is not far to the east and only a little north of the Cobble, we usually drive there from Salisbury. Heading out of Salisbury on Route 44 toward Canaan, we turn left at the first sign which directs to Twin Lakes. (These are quite large and are popular resort spots.) But our road passes them by to the west, going through a part of the village of Taconic and then turning from a macadam to a comfortable dirt road.

Throughout this border area between Connecticut and Massachusetts, the itinerant naturalist is aided by dirt roads which lead into many fertile, well-forested areas. Re-

Parnassia glauca.

Gentiana andrewsii.

sponsibility for this happy state of affairs is undoubtedly the decline of New England's agriculture in our century. Most of the land had been cultivated at some time or other, but farm after farm was abandoned. Animals and plants returned. Beavers created ponds and extended marshes. But the roads remain. The higher ground in the valley is pretty well worked out, but in the hollows natural life flourishes.

Many of the older houses also survive. The owners are summer visitors, retired people, or "gentlemen farmers." The land is left alone, farmland in name only. This accounts for the fact that in an area of relatively heavy rural population the incidence of pseudoprimeval conditions is much greater than in many much less-populated regions in the South and Middle West. Temporarily at least there is not the economic temptation to exploit the land as in New Jersey.

About a half mile beyond the beginning of the unpaved road we begin to go through woods, noting that these are not the usual sour oak woods but woods rich in interesting herbaceous under growth, even where the youthful trees indicate relatively recent lumbering. We drop into a hollow, after passing a farm, and cross a little brook. Suddenly we are among huge pines, one of those good tall stands which must have been planted forty or more years ago and which we find in a number of places nearby.

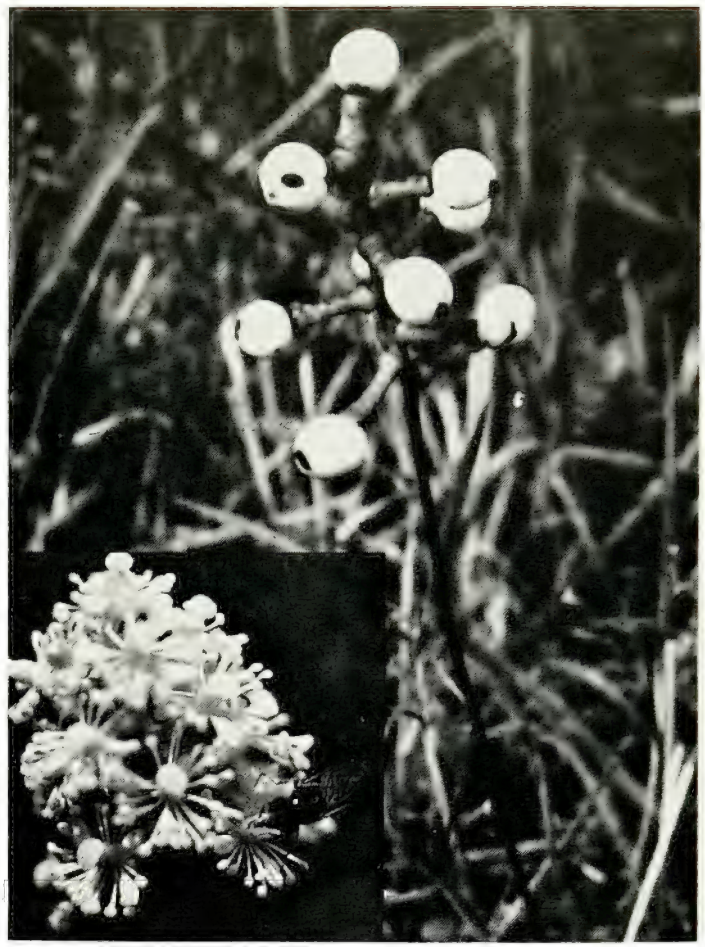
The trees are, I suppose, white pine *(Pinus strobus)*. Their thick, straight, black trunks, often bearing near the ground a mass of dry, spear-sharp remainders of lower limbs, and the thick, dark growth at the top makes for a sometimes weird, sometimes cathedral-like setting. The very tall growths let in more light than the shorter ones. But this does not completely account for the fact that under some of the stands the ground is sterile, being nothing more than a blanket of brown pine needles, while under others many flowering plants exist and flourish. My guess is that the trees do well in poor and rich soil but that the plants find the shelter very favorable, provided that the earth is rich in moisture and nutritive elements.

In this place there is a fairly steep rise on one side with no undergrowth. On the other, it slopes down to a swampy patch of considerable extent. Each side has a typical flora. In the swamp spring brings out all the most familiar plants, hepaticas, violets, trilliums, showy orchids, clintonia, buttercups, merrybells, trout-lilies, Jack-in-the-pulpit, and Solomon's seal. Several clumps of yellow lady's-slipper orchids are of a somewhat rarer breed. The specialties are in July and August. The pink fringed orchid, *Habenaria psycodes,* grows in groups every few feet and is followed a few weeks later by the four-foot, purple stems of the tall purple fringed orchid, *Habenaria fimbriata.* Almost any one of the native flowers of the region can be found here at some time of the year.

On the other side of the road there is not so much. About the time of the fringed orchids, the spotted coral root, *Corallorhiza maculata,* dots the smooth pine needle blanket. It is a curious plant which retains the freshness of its flowers long after the ovary has grown outsize and the pedicel droops towards the ground, giving the plant the appearance of a clothes tree molded of tired rubber. Climbing the hill we find Indian pipes and pinesaps and pipsissewa, until we come to a modest cliff which is literally covered with walking fern. The outcropping extends for a hundred yards and is loaded with as healthy a show of this fern as one is likely to see.

Above the cliff is a gentle plateau chiefly bearing rattlesnake-plantain orchids *(Goodyera)*. They are a colorless group; but the rosette of leaves on the ground, with its brilliant contrast of green and squared white veining, is attractive. Examine the flower under a lens and it is meta-

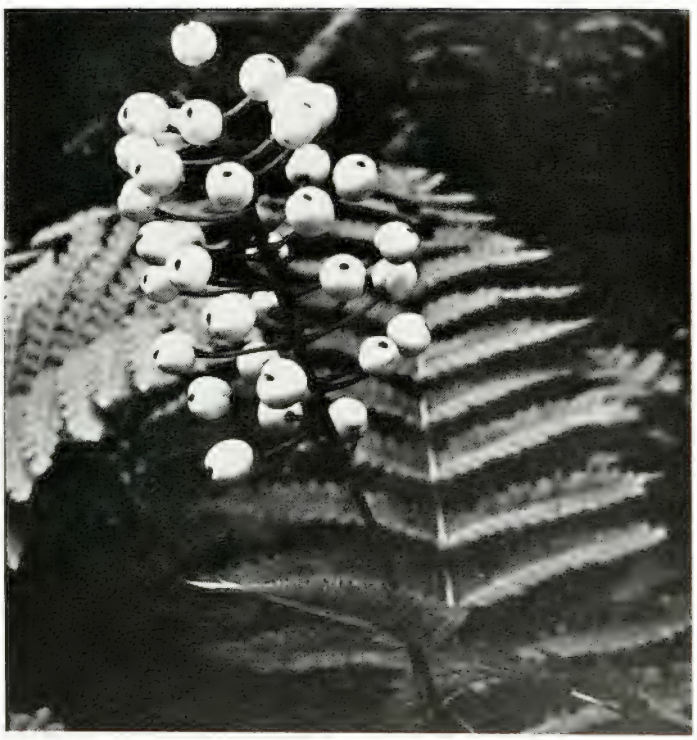
Actaea pachypoda.



Fruit and flower, in insert, of *Actaea pachypoda.*

Actaea rubra.

Actaea rubra.



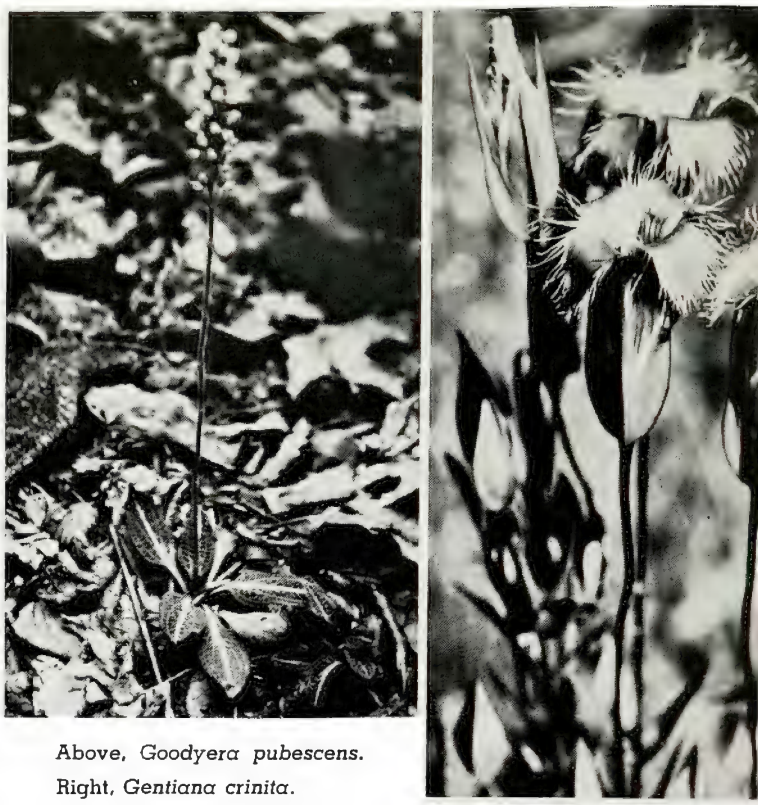
morphosed into a rose-bud form, delicately pink or ivory and covered with short, fine hairs, each of which bears at its tip a bead of secretion.

Similar to this hillside is another place which was once a quarry. Cut out of the slight rise on both sides of the road, it has not left the usual scars. Rather it has carved both hillocks into tiers, and time has covered them with moss and pine needles. Some of the huge blocks still lie around like sculptured monuments, bearing a load of moss and little plants. Here, one late afternoon, with the sun slanting through the trees, we saw rattlesnake ferns three feet high scattered about like sentinels. Each one was perfect. The leaves formed triangular platforms from which the spore-bearing shaft rose in perfect proportion, topped by the clusters of spore sacs blazing in the shafts of golden light. I have looked for that effect again and again, but it has never been quite the same.

Up on the rock, on the joining line between pine and deciduous trees, grew the autumn coral-root orchid, *Corallorhiza odontorhiza,* one of the smallest and daintiest of the genus. The stems are quite pink and the tiny flowers, a couple of millimeters across, consist of a round, white lip prettily dotted with pink, very much like a cocktail apron. There were hundreds of them, much prettier than some greenish-stemmed and purplish-flowered ones we have seen elsewhere.

The valley is full of big bogs which offer a mine of beautiful things. But they are a special case and a short account would not do them justice. It requires a more thorough description to convey their unusual charms and particular difficulties.

There is one road whose borders seem made for all the flowers which enjoy the sun and a wet meadow. In July the sides are thick with grass-of-Parnassus *(Parnassia glauca),* the large, white, buttercup-shaped flowers decorated with brown lines and with curious fleshy, green-cusped leaves. In the grass one finds quantities of ladies'-tresses (orchids) and little lobelias, such as *L. kalmii* which has the outline of one of Mary Petty's maids. Along the watercourses there are scarlet blotches of *Lobelia cardinalis* and sturdy groups of turtleheads *(Chelone glabra).* In the fall the show reaches its height. Ironweeds, Joe-Pye-weed, and asters of every size and color fill the fields. These are the brasses of the orchestra. Somehow even more thrilling are the muted tones of the gentians which, happily, tend to grow together away from the competition of these other plants.



Above, *Goodyera pubescens.*
Right, *Gentiana crinita.*

The gentians are something special because of their blue. It is of an incomparable richness and is especially welcome in the fall when, for all their brilliance, the colors are mainly purple and yellow. Splendid as is the fall foliage the eye turns to gentian-blue with a sense of relief at times.

In the valley are many gentians, the most exquisite and the most famous being the fringed gentian, *G. crinita.* The day, we hope, will come when this plant can be tamed to garden conditions, though so far all efforts have failed. Occasionally we find pure white ones and even some which are zoned alternately blue and white. The bottle gentian is everywhere and, though less shapely, has the darkest blue of all. On this very road are also some which are white. The bottle gentian, *G. andrewsii,* forms sturdy plants with flowers partly closed and partly fringed, and one may come across the similar soapwort gentian, *G. saponaria.* Finally there appears in October *Gentiana quinquefolia,* the stiff gentian, no longer blue, which says farewell to summer for all the plants.

Thou blossom, bright with autumn dew
And colored with the heaven's own blue,
Thou openest, when the quiet light
Succeeds the keen and frosty night.

Thou comest not when violets lean
O'er wandering brooks and springs unseen,
Or columbines, in purple dress'd,
Nod o'er the ground-bird's hidden nest.

Thou waitest late, and com'st alone
When woods are bare and birds are flown,
And frost and shortening days portend
The aged year is near his end.

Then doth thy sweet and quiet eye
Look through its fringes to the sky,
Blue, blue, as if the sky let fall
A flower from its cerulean wall.

Lines by William Cullen Bryant on the fringed gentian.

MUSHROOMS IN THE MAILBOX

By A. A. PIRINGER *and* JOHN A. STEVENSON

A. A. Piringer is Plant Physiologist, John A. Stevenson, Mycologist, respectively, of the Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland. Both are philatelists.

MANY KINDS OF plant parts have appeared on thousands of different postage stamps of the world. Flowers have been particularly prominent on stamps since the mid-1940's. Mushrooms, however, did not appear on the postage stamp scene until 1958 when both Czechoslovakia and Romania issued them. Since then six countries have issued a total of forty-four stamps portraying twenty-two different edible, and two poisonous mushroom species, representing twelve genera, four families, and two orders of fungi (Table 1, See page 172).

The countries that have issued mushroom stamps are Czechoslovakia, Romania, Poland, Bulgaria, Mongolia, and Russia. It is noteworthy that all are "Iron Curtain" countries, and the stamps of all, except Russia, carry both the specific Latin names of the given mushroom species as well as their local names. One stamp from each country's set is illustrated to show the stamps' characteristic details.

Boletus is the most popular genus and it appears on thirteen stamps of the six countries. No mushroom species was popular enough to appear in sets from all countries, but two species, *Boletus edulis* and *Lactarius deliciosus,* were enough esteemed to appear on stamps of at least five of the six countries. Other popular species, those fruiting on three countries' stamps, are *Agaricus (Psalliota) campestris, Armillaria (Armillariella) mellea,* and *Cantharellus cibarius.*

The two poisonous species are *Amanita muscaria* appearing in the Czechoslovakia and Polish series and *Amanita phalloides* in the Polish series. *Amanita muscaria* (Figure 1), the fly mushroom, causes serious illness when eaten but *Amanita phalloides,* the notorious "death angel," is the ultimate in mushroom poisoning! Both poisonous species are featured by Poland to publicize their danger, and Poland particularly emphasizes that danger by labeling each with the poison-warning expression "Trujacy!" (Figure 3). In contrast was the portrayal of an edible species of the same genus, *Amanita caesarea,* by Romania and Bulgaria. This species has been known through centuries of history as Caesar's mushroom and in the days of the Caesars reputedly could be eaten only at the Emperor's table.

The first, and best, of the mushroom stamps are those of Czechoslovakia which issued, in 1958, five attractive rectangular stamps ranging in value from 30 haleru to 1.60 koruna (100 haleru = 1 koruna = $0.07). The Czech stamps are excellent for color and detail and portray the following species: *Lepiota procera, Boletus edulis, Krombholzia (Boletus) rufescens, Amanita muscaria,* and *Armillariella (Armillaria) mellea.* All are edible species except *Amanita muscaria,* the fly mushroom, and the stamp showing this toxic species appears to have poison ivy in the foreground to emphasize its toxicity (Figure 1), although poison ivy is known only in the botanic gardens of Europe.

The next series is that of Romania which issued, also in 1958, ten rectangular stamps ranging in value from 5 bani to 2 lei (100 bani = 1 leu (lei) = $0.08). Colors and technical details of these stamps are very good and the following species, all of them edible, are shown: *Lepiota procera, Clavaria aurea, Amanita caesarea, Lactarius deliciosus, Armillaria mellea, Coprinus comatus, Morchella conica* (Figure 2), *Psalliota (Agaricus) campestris, Boletus edulis,* and *Cantharellus cibarius.*

Poland was the third country to postally recognize mushrooms and, in 1959, issued eight triangular-shaped stamps ranging in value from 20 groszy to 5.60 zloty (100 groszy = 1 zloty = $0.04). Colors and details of Poland's stamps are fair to good and the series shows the following species: *Amanita phalloides* (Figure 3), *Boletus luteus, Boletus edulis, Lactarius deliciosus, Cantharellus cibarius, Psalliota (Agaricus) campestris, Amanita muscaria,* and *Boletus scaber.* The series shows six edible and two poisonous species. The poisonous ones are *Amanita phalloides* and *Amanita muscaria.*

In 1961 Bulgaria issued eight rectangular stamps ranging in value from 2 stotinki to 2 lev (100 stotinki = 1 lev = $0.50). Bulgaria's stamps are mainly diagrammatic with very bright, spectacular, but atypical colors. The species shown, all of them edible, are as follows: *Amanita caesarea, Psalliota (Agaricus) silvatica, Boletus elegans, Boletus edulis, Lactarius deliciosus, Lepiota procera, Pleurotus ostreatus* (Figure 4), and *Armillariella (Armillaria) mellea.*

Three years passed before Mongolia, in 1964, issued its set of eight very large diamond-shaped stamps ranging in value from 5 mung to 1 tugrik (100 mung = 1 tugrik = dollar equivalents unavailable). The stamp colors are bright and illustrations are fairly accurate and well detailed. The eight species shown, all of them edible, are as follows: *Coprinus comatus* (Figure 5), *Lactarius torminosus, Psalliota (Agaricus) campestris, Russula delica, Ixocomus (Boletus) granulatus, Lactarius scrobiculatus, Lactarius deliciosus,* and *Ixocomus (Boletus) variegatus.* One does not think of Mongolia particularly as a "mushroom country," but a check of authoritative literature indicates that all of the above species could possibly be found there.

The country to issue mushroom stamps most recently, in late 1964, was Russia which produced five small square stamps ranging in value from 2 to 12 kopeks (100 kopeks = 1 ruble = $1.11). The Russian stamps are mycologically better portrayed than the Bulgarian, but poorer than those of other countries for accuracy of color and detail. All of the species shown are edible: *Boletus luteus, Cantharellus cibarius, Boletus edulis* (Figure 6), *Boletus versipellis (auranticus),* and *Lactarius deliciosus.*

Mushrooms gathered in woodlands and meadows are an important food source in a number of European countries. Because of the danger of harvesting poisonous species the governments of several countries, and Switzerland in particular, permit only known edible species to be sold in the

Fig. 1, Czechoslovakia—*Amanita muscaria.*

Fig. 2, Romania—*Morchella conica.*

Fig. 4, Bulgaria—*Lepiota procera.*

Fig. 3, Poland—*Amanita phalloides.*

Fig. 5, Mongolia—*Coprinus comatus.*

Fig. 6, Russia—*Boletus edulis.*

markets and appoint competent inspectors to protect the public against tragic mistakes during the mushroom season. Colorful postal series of the more important edible and poisonous species can provide widespread visual aids to any national publicity campaign against mushroom poisoning. Such a series would be an attractive addition to any stamp program, as well as provide a supplementary income as an added inducement. It will be surprising indeed if other countries, particularly those of western Europe, do not spawn mushroom stamps! (Continued on page 172)

A BOTANIST AT McMURDO SOUND

By WILLIAM C. STEERE

Dr. Steere is Director of The New York Botanical Garden

ANTARCTICA IS FAR MORE REMOTE in accessibility and hostile in environment than the Arctic, man having first set foot on its mainland only a century or so ago. Nevertheless, Antarctica today has become the scene of a lively and well-coordinated international research effort, since it provides a vast and uncontaminated natural laboratory which displays amazing examples of the forces of nature at work. The weight of seven million *cubic miles* of ice has depressed the land surface of Antarctica to such an extent that if the ice were removed, the entire continental crust would slowly spring back more than two thousand feet. The enormous mass of this nearly two-mile thick polar ice cap influences the circulation of much of the earth's air and water and holds the oceans at levels which we accept as normal. If the ice cap melted, however, the oceans would rise fifty feet or more and submerge the great coastal cities of the world.

The United States participates with eleven other nations in a cooperative scientific investigation of Antarctica. By direction of the President, the National Science Foundation bears the responsibility for planning, coordinating, managing, and funding the United States Antarctic Research Program to provide scientists with the means to carry on their search for new knowledge in Antarctica. The Department of Defense, also by direction of the President, is charged with planning and carrying out operations in support of the scientific and other programs, which include transportation, cargo shipment, construction and maintenance of facilities, housekeeping and communications. This logistic support is carried out by the United States Navy, through the Commander of the United States Naval Support Force, Antarctica (Task Force 43), which has its headquarters at Christchurch, New Zealand. The Department of State, in addition to developing United States foreign policy with reference to Antarctica, serves as the coordinating center for the various other Federal agencies which are concerned with Antarctica matters.

With the support of the National Science Foundation's Antarctic Research Program, Dr. Stanley Greene of the University of Birmingham, England, and I were fortunate in having been able to spend several weeks during January and February, 1965—the austral summer—at and in the vicinity of McMurdo Station, Antarctica, over two thousand miles directly south of Christchurch, New Zealand, and only a few hundred miles from the South Pole.

In Antarctica, plants must endure the most rigorous environmental conditions known on the face of the globe. At McMurdo Station, the largest United States installation (77 51′ S. Lat., 166 40′ E. Long.), the mean annual temperature is +0.14 F., and at the South Pole Station, established on top of more than some ten thousand feet of ice and snow, the mean annual temperature is —56 F! The mean summer temperatures (December, January, and February) of these two stations sound like midwinter temperatures in New York and Fairbanks— +22.46 F. and —26.50 F., respectively. It is remarkable that plants can grow at all under the temperature regime of McMurdo Sound, where the mean summer temperature is below freezing. However, with sunshine, or at least light, for twenty-four hours a day during the summer, the ground does absorb and accumulate heat, so at the surface of the

Upper right, McMurdo Station.
Lower right, Mt. Erebus with vapor plume.
Below, west of Granite Harbour.

Mosses, *Bryum* spp., in the Antarctic.

soil and somewhat above it, above-freezing temperatures occur. To avoid misleading the reader, it should be made clear at this point that the only terrestrial plants at the latitude of McMurdo Sound and the Ross Sea in Antarctica are mosses, lichens, and a few algae.

In addition to its astonishingly low temperatures, the climate of Antarctica also presents a further limiting factor for plants—lack of water. During the period that plants must use as the growing season, little rain falls. The air is so dry that any fallen snow tends to evaporate instead of melting. Under these conditions of severe aridity, mosses can exist only where seepage water becomes available from the melting of glaciers or winter snow banks. To anyone who has observed mosses in our northern climates, it is surprising to find in Antarctica that mosses almost never grow directly on rocks but usually on moist sand and silt between them, where they derive some protection from the desiccating winds. In Victoria Land, at the west side of the Ross Sea, about fifteen species of mosses have been discovered, primarily in the vicinity of McMurdo Station and Hallett Station (operated jointly by New Zealand and the United States). The other permanent research stations operated by the United States, Byrd, Eights, and South Pole, completely lack vegetation because they are built on the great inland ice sheet, either on the surface of it or in tunnels below the surface. The pleas and plausible rationalizations of botanists who would like to visit research stations on the inland ice, especially South Pole Station, are generally refused, partly because the planes making flights between stations are already filled with passengers and cargoes and partly because antarctic flights in general and ski-landings on the ice cap in particular are bound to be hazardous enough to proscribe passengers without a valid or highly urgent reason to be aboard.

The Antarctic Peninsula which juts out toward the southern tip of South America, and which is geologically related to it, presents much more favorable conditions for the growth of plants than the areas just described. The reason for a relatively better climate (although still far worse than any arctic area) depends partly on the lower latitude and partly on the lack of an ice cap, which has withdrawn from the area and left only mountain glaciers—and these do not control the climate as violently as the inland ice does. Far more species of mosses and lichens occur in the land vegetation of the Antarctic Peninsula than in the McMurdo Sound area, for example. Moreover, two flowering plants occur there, one grass *(Deschampsia antarctica)* and *Colobanthus kerguelensis* of the *Caryophyllacea.*

A botanist working at the McMurdo Station finds the conditions for his research astonishingly adequate. The Biological Laboratory is very well equipped with microscopes and with an impressive array of modern equipment for experimental work. For research in Antarctica, it must be kept continually in mind that every bit of equipment, supplies, or reagents must be arranged in great detail six months to a year in advance. Plane traffic between Antarctica and its neighboring continents is practicably impossible during at least eight months; the few flights during midwinter have been made necessary by serious injury to personnel wintering over on an emergency basis. And even during the brief summer period, it is both difficult and time-consuming to obtain some item which may have been forgotten, no matter how urgent its need may be. Fortunately, stocks are good, scientists who work in the field must be resourceful, and McMurdo Station has excellent and imaginative machinists who are accustomed to improvising sudden and vital needs. Nevertheless, in Antarctica even the best-organized and widely experienced person is brought face to face with the bitter truth that what research he can do depends entirely on how minutely he anticipated every possible need, as well as on what his predecessors in the laboratory have left behind. It is excellent discipline for one to force himself to plan every minute detail of his research so fully that he anticipates all needs; one who has easy access to great supply houses specializing in all kinds of scientific equipment and materials tends to become embarrassingly absent-minded about his needs for the long-term future.

Field work in the vicinity of McMurdo Station and to points up to a hundred miles away is made extraordinarily easy by the helicopter service provided by the United States Navy. Although we were occasionally weathered in by fog, snow, and high winds, Dr. Greene and I were able to sample the major areas of exposed land both on Ross

(Continued on page 159)

Left, Dr. William C. Steere, attired in specially designed clothing to work outdoors in the Antarctic. Right, Dr. Stanley W. Greene, examining mosses.

A FEW NOTES ON PLANT PROPAGATION

By ALBERT LOWENFELS

Mr. Lowenfels is a member of The New York Botanical Garden. He is head of the Hotel Bar Butter Company, but for a number of years he has devoted every spare minute to his serious hobby, plant propagation, and has attended every meeting of the International Plant Propagators Society since 1952. After being a junior member of the Society for five years, he was finally accepted as a senior member which gives him as "much pride as anything he had accomplished in a long life." He is also a member of the New York State Nurseyman's Association, for he has successfully propagated so many things that he now has a nursery on his eight-acre Willow Lake Farm in White Plains, New York.

HOW FAST OUR WORLD has changed in just a few years! Nuclear weapons, orbital flights, and even TV were unthought of not so many years ago. One could mention numerous other things, including Supermarkets and Social Security, but the point I want to make is that our knowledge of plant life has also increased greatly. This article will treat just one phase of that vast subject—plant propagation as a supplement to the article I wrote for *The Garden Journal* in the May-June, 1960, issue.

There are now three up-to-date books on plant propagation. *Plant Propagation Practices* by James S. Wells (1955) is a fine volume, easily read, well illustrated, good for beginner and advanced amateur, and even for a professional. Well's book is devoted to ornamentals. *Plant Propagation* by Mahlstede and Haber (1957) and *Plant Propagation* by Hartman and Kester (1959) cover almost the entire field in greater detail. All are fine, but as a single choice I suggest starting with Wells. Incidentally, I'm sure the Garden's Book Service will be glad to get these or any other books for you.

Books on propagation are generally divided into two sections: 1) growing from seeds and 2) asexual propagation which includes cuttings, grafting, budding, layering, and growing from scales of lily-type bulbs. Asexual propagation produces a plant the exact replica of the parent.

If you want to grow annuals or perennials, the seed packets usually furnish proper instructions. However, you can also grow evergreens and shrubs from seeds. Among the evergreens, hemlock, yews, spruces, and pines are a few which come readily to mind. Broad-leaved evergreens, such as rhododendrons and azaleas, are quite easily raised from seeds, and you can raise hollies from seeds, too. (Holly seeds often take two years to germinate.) Deciduous shrubs can be grown from seeds. Some years ago I saved seeds from hybrid lilacs—they are blooming-size shrubs now, and one or two are superb. It is most interesting to see the variations in seed-propagated shrubs, and who can tell, maybe you'll obtain something new and worthwhile.

I should mention another book, which will give you information on growing woody plants from seed—*Woody Plant Seed Manual.* This is a publication of the United States Department of Agriculture, Miscellaneous No. 654, priced $3.00. It tells how to handle, extract, store, stratify, and plant seeds, and follows with detailed information on some of the best-known trees.

Now as to asexual propagation, grafting and budding require a fair amount of knowledge and skill—and a greenhouse is a necessity. It also entails growing understock on which you can graft a bud, so I am confining this article to cuttings.

Generally speaking, cuttings can be separated into two classes—hardwood or dormant and semihardwood or soft. True, some species, such as begonias and African violets, can be reproduced by using leaves. Some of the books I mentioned previously have over five hundred pages of solid information, so obviously I can give only a brief summary in the space available.

Hardwood cuttings are taken from deciduous shrubs or trees after the leaves have dropped and into the winter from many deciduous shrubs and vines such as forsythia, spiraea, grape, and wisteria. All you do is to cut sticks, five to twelve inches long, being sure that there are a few buds on each. Tie the sticks, the cuttings, into bundles and give them a cold rest period in one of two methods: 1) Wrap the cuttings in damp sphagnum or peat moss and put them in plastic bags in the refrigerator, where the temperature is usually about 40°; dampen, but do not really wet the moss. 2) Bury the cuttings in the ground below frost-line—a covering of leaves over this area is helpful. If you bury the cuttings in the ground, tie the bundles with a waxed string or light wire, since ordinary string may rot.

In early spring these cuttings can be set in beds or rows in the open ground or in frames, depending upon the weather. No special medium is necessary—they should prosper in well-drained soil and make one or two feet of growth that season. In planting, be sure to keep the base down and to have one bud or more above the ground. Little that is new has been developed in handling hardwood cuttings—this method has been in use many years—but you might dip the base of some of the cuttings in a mild hormone powder, "Rootone" or "Hormodin No. 1," and observe whether you get better rooting that way.

Major developments have taken place in inducing softwood and semihard cuttings to root: 1) the use of mist on cuttings and the means of getting the mist on the cuttings and 2) the discovery of root-promoting substances, commonly called hormones.

Why is misting, which is sometimes referred to as fogging, so beneficial? Every gardener knows that sunlight makes plants grow, but we also know that if we expose a cutting to the drying influence of the air and sun, it will die. The leaves are powerhouses of energy, drawing water and other nutrients from the soil through the root system. After getting the moisture, the leaves transpire whatever is not needed through the cells called stomata. A healthy, actively growing shrub is in a perfect state of balance. The roots are working for the parts above the soil, and the leaves are encouraging the roots to develop, But the minute you have taken a cutting, you have removed all chances of its getting the needed moisture. The cells in the leaves are still giving out moisture—and unless you furnish means of replacing it, the cutting will die.

This is why misting is so valuable. It provides the cutting with enough moisture to keep it turgid and thriving until it forms roots and can be on its own. With a misting system, you can put cuttings in full sunlight during the hottest weather.

Misting was first used in this country in the early 1940's, and at that time it was kept on the cuttings all day. Then it was found that cuttings didn't need that much moisture, and a time clock was installed in the circuit. A typical clock might turn the mist on for six seconds of every minute. (Another time clock can be installed to turn the system on during the day and off at sundown.) Many large growers still practice this system, but there is the disadvantage that the clock doesn't know when it is cloudy or raining, and some one has to watch.

About ten years later, Harvey Templeton of Winchester, Tennessee, invented what he called an "electronic leaf" for his own use. (I do not believe he ever sold any.) This is a piece of plastic in which are imbedded two pieces of carbon attached at the bottom to wires which lead to a small box containing a vacuum, radio-like tube which amplifies the current. One part of this box is attached to any 110-volt circuit, the other to a solenoid valve which is in the water line and which controls the mist. The small electronic leaf is put in the propagating bed under a nozzle. When the protruding pieces of carbon get wet from the water covering the "leaf," the water is turned off; when they become dry, the water is turned on. (Perhaps I should explain that the solenoid valve is one that opens and shuts the water through an electronically controlled magnet.)

The best electronic leaf I have seen is now made in England; it is available in this country from James S. Wells, 474 Nutswamp Road, Red Bank, New Jersey 07701. The price of the complete outfit is $125.00 postpaid; the nozzles—and they are very good—are $2.95 each. The piping you can install yourself—or you can call on a plumber to set it up. I have used this system for four years with satisfactory results.

Another system of mist control is sold by E. C. Geiger, North Wales, Pennsylvania 19454. This is a simpler system called "Mist-A-Matic," working on the weight of water. A device holding a wire screen is set among the cuttings; when this gets wet, the misting stops. No further amplification is necessary. Incidentally, one control will handle as many nozzles as required, with either system; each nozzle covers about three square feet. The cost of this system is $78.00 plus postage. Mr. Geiger's folder lists this and other gardening aids.

A third system, for amateur propagators, is called the "Mistic Bubble." It is a plastic cover set on curved wires to form a half globe; a nozzle and connections are furnished with it. This is placed on the ground, in the open, with the nozzle in the middle of the Bubble. There are no controls, but I am assured that the device functions well. It is available from Jewel Templeton of Winchester, Tennessee, for about thirty dollars. I'm sure Mrs. Templeton will be glad to give you further particulars.

What medium should you use for your cuttings? A few years ago, when visiting The New York Botanical Garden, I noticed an electronic leaf system in use, with the cuttings in what appeared to be a red brick dust. Inquiry revealed that this was from broken flower pots. So I went home, broke some flower pots, and tried to get pieces small enough for a propagating medium—but I didn't succeed.

You can use any medium which will hold the cutting upright, retain some moisture, allow air to penetrate, and

The "Mistic Bubble" is used by amateur propagators.

have such good drainage that it will not become soggy. Many growers use coarse sand, others "Perlite," obtainable at garden supply stores or garden centers, and some peat moss. I have found that a combination of sand, or "Perlite" and peat moss is the most satisfactory.

If you do not possess a greenhouse, you can carry on plant propagation outdoors by preparing a well-drained bed (stones at the bottom are advisable) with boards or other protection around the bed to prevent the wind from blowing the mist. You're wondering what plants you can propagate in an outdoor bed. Almost any deciduous shrub, including azaleas, and possibly some evergreens.

When should you take cuttings? For softwood cuttings, say forsythia, when the growth is flush in early summer. An old rule of thumb—if you bend a cutting and it breaks clean, then this is to time to take it. You might try propagating magnolias from softwood cuttings—or try any shrub. You'll gain experience.

The deciduous azaleas (mollis type) are a little more difficult to root; they should be taken early and they need a stronger hormone. Cuttings of the evergreen types are taken during July and August, when the new wood is just turning brown. By the way, you should strip the leaves from the base of all cuttings; this lessens the danger of rot from immersed damp leaves and gives wounds to the cuttings from which roots may form. Allow some leaves to remain above ground—this stimulates root formation.

You can also take summer cuttings from evergreens. Yew cuttings, for example, planted when the first flush of growth has hardened a little, are very likely to form roots which leads to another subject, root-promoting substances.

Many professional plant propagators use "Hormodin," obtainable in one-ounce packages at many garden stores. You can use the one-ounce package on a large number of cuttings. Hormodin comes in three strengths, Nos. 1, 2, and 3. The first is used on most softwood cuttings, except evergreens for which No. 3 is used. Directions are printed on each can. "Rootone," another powder readily obtainable, comes in two strengths—regular and No. 10. Again, the heavier strength is required for most harder-to-root cuttings, and you just dip the cuttings in the powder before planting

With a greenhouse you can, of course, accomplish much more, propagating your own rhododendrons, hollies, and other plants over a longer season. I have successfully rooted hollies, for example, as late as December and January, and controlled and overwintered plants with greater ease.

Some growers root cuttings under fluorescent lights. Garden stores sell a special type for this purpose and also fixtures and plant stands.

Another propagating aid is an electric cable. It is a known fact that if the base of a cutting is kept warmer than the exposed part, this helps the initiation of roots. Garden stores or the big mail-order houses sell these electric cables—they are usually sheathed in lead around the wires. And for a modest sum, you can buy a control so that you can maintain the temperature as desired. Around 65° to 70°, even 75°, is generally recommended.

A further method of increasing your stock of plants is by layering. No equipment is required. Layering is done by mounding soil around the plant or bending down branches so that they will be covered with soil. Wounding the bark slightly and applying hormones could be helpful. The covered branches should form their own roots within a year, can then be severed, planted, and nursed a little for the first year—and again you will have a duplicate of the mother plant.

Roots developed on these cuttings within two weeks in the "Mistic Bubble."

A BOTANIST AT McMURDO SOUND (Continued from page 156)

Island, the site of McMurdo Station, and the mainland of Victoria Land across McMurdo Sound. The only difficulty encountered in field work was in trying to cover any great distance on foot while encumbered with enormous insulated rubber boots, the thick clothing and heavy scarlet parka, all specially designed by the Antarctic Research Program to enable its investigators to work outdoors for hours at a time in extremely cold weather.

Unlike the early and even recent explorers in Antarctica, investigators supported by the United States Antarctic Research Program have to spend relatively little time and energy in combating the environment, thanks to adequate housing, excellent food, outstanding laboratory facilities, and field transportation by helicopter. These services enable a field scientist, then, to devote almost his full energies to the primary purpose of his visit to Antarctica.

In summary, one of the most fascinating botanical problems in Antarctica is how land plants can grow so close to their ultimate tolerance of their environmental conditions. What small change would it take to inhibit their growth entirely? A few more degrees of cold during the summer? An even dryer atmosphere? A highly rewarding investigation would be to carry on a series of experiments at the Biological Laboratory at McMurdo to find out under just what circumstances the mosses would have to give up, finding it impossible to survive. The whole question of survival of plants and animals under extraordinarily severe conditions, at the very margin of survival, is becoming more and more timely as we consider the conditions existing on other planets and ponder seriously whether or not there can be living plantlike organisms there, as has been suggested by science fiction writers for a long, long time and by serious scientists for only a few years. The question of man's own survival on an alien planet and of his cultivated plants raises still further problems.

Tiarella wherryi is a non-trailing foam-flower with creamy white flowers in late spring. The colorful and beautifully shaped leaves are a pleasure at any season.

WALL GARDENING

By REX MURFITT

Mr. Murfitt is Manager of Stonecrop Nurseries, adjoining the house and gardens of Stonecrop, Mr. and Mrs. Francis H. Cabot's beautiful place at Cold Spring, New York. The 1965 Spring Garden Tour, sponsored by The Advisory Volunteers of The New York Botanical Garden, visited the gardens and nurseries.

WALL GARDENING does not mean that one has to be an expert stonemason, capable of building free standing walls of perfectly fitted stones, nor does it require any knowledge or use of mortar. When wall gardens are mentioned, what do you think of?

You may visualize a wall around an old country cottage, ablaze with bright aubrieta, arabis, alyssum, and gilliflower (wallflower). Others may see a high retaining wall of weathered, "mossy" stone with campanulas, pinks, hyssop, and heather in great clumps. I remember beautifully proportioned terraces, one upon the other, of soft, mellow Sussex sandstone, planted with hundreds of rare and exciting plants. In my mind today I see the wine-red flowers of a sun-rose glowing against sandstone steps; a shaded wall, the orderly stones covered with the filmy green of *Arenaria balearica,* its mist of white flowers on minute stems.

All this sounds very nice, but what can you do to have a wall garden? First take a look at the landscape design. Perhaps the formal lines of a raised bed will blend in, if a retaining wall is not in order. The raised bed will give at least two walls of different aspects, and a valuable planting area on top. Are there any field-stone boundary walls close to the house and garden? These make wonderful backgrounds for terrace beds built with low stone walls. A raised bed, three or four feet wide, about two feet high and and twenty or thirty feet long, built against an old wall, makes a fascinating addition to the garden. The smaller alpine plants can be seen to perfection in their elevated homes. Those steep grass banks, so tedious to keep neat, can be converted into a hanging garden by substituting a retaining wall. New houses invariably have grading difficulties due to the excavating and leveling for the foundations, the subsoil usually being pushed about unimaginatively by a bulldozer, some topsoil spread and grass seed sown. A series of low retaining walls adds solidarity to the house and creates a far more pleasing approach from the road. The driveway is often a nuisance to many home owners, especially when soil is washed down on the blacktop every time it rains. A low wall, leaning back into the bank, is almost complete in itself without the addition of plants.

This is not the place to discuss construction in detail. However, a few basic tips might be helpful:

1. Set two metal posts where the two corners will be, and stretch a line between them. A wall must be absolutely straight.
2. The wall should not be erected exactly upright, but should lean slightly back into the bank.
3. Select the largest stones for the lower courses, the squarest stones for the corners where the strength must be the greatest.
4. Plant as you build, it is easier and the plants have a better chance to establish themselves. Be sure to have a supply of good soil near at hand.
5. The final layer of stones forming the coping should

Silene wherryi, a subspecies of *S. caroliniana* with low, tufted habit, spoon-shaped leaves, and one-inch wide, clear pink flowers, likes a deep crevice in partial shade.

Dryas octopetala, a prostrate shrublet from the north
large, white flowers in

be fairly broad and flat so that they will remain in place. And above all, make sure that the top of the wall is dead level; if not, it will irritate you for ever.

6. All waste pieces of stone and debris can be placed behind the wall for added strength and to save on fill.

When the vertical wall is finished and planted, the space behind it should be filled and tamped firmly into place. It is safe to use any kind of fill for the first two-thirds, but the top one-third should be good soil mixed with equal parts of humus or peat moss and sand or crushed stone.

Now the raised bed is ready for planting—this is the reward, the greatest pleasure. It would be advisable, before beginning the planting, to place flat stones at convenient distances to serve as stepping stones. They prove very helpful when planting and weeding. You will probably feel that the flat expanse of the bed needs an added feature—and you are right. Set some interesting weathered stones at uneven intervals, avoid getting them in line. Place them in parallel angles, which will suggest that they are part of a greater underlying stratum.

To accentuate this alpine landscape in miniature, you will need three or four dwarf evergreens carefully placed to allow for subsequent growth and with consideration for the many months during which they will be the only green visible. If an upright conical specimen is planted next to one of the larger stones, it will give the illusion of solidarity; they complement each other and suggest a stately forest giant beside a towering cliff. *Picea glauca conica (P. albertiana conica),* which after many years grows to four feet, and *Picea abies remontii,* a much slower-growing little spruce, are two recommended subjects.

Two or three compact varieties, depending on the size of the garden, and chosen for their habit of growth and color, should be set at strategic places. Finally, a completely flat evergreen can be planted in such a position that it will eventually trail over the edge of the wall; *Juniperus squamata prostrata, J. horizontalis wiltonii,* and *J. horizontalis* 'Bar Harbor' are good varieties for this purpose. Be on your guard against fast-spreading junipers.

When it comes to the herbaceous plants, it is advisable to plant the more vigorous kinds in the vertical crevices where they can spread to their fullest advantage. The upper surfaces of the raised bed should be reserved for the smaller treasures, which can be better enjoyed closer to eye-level.

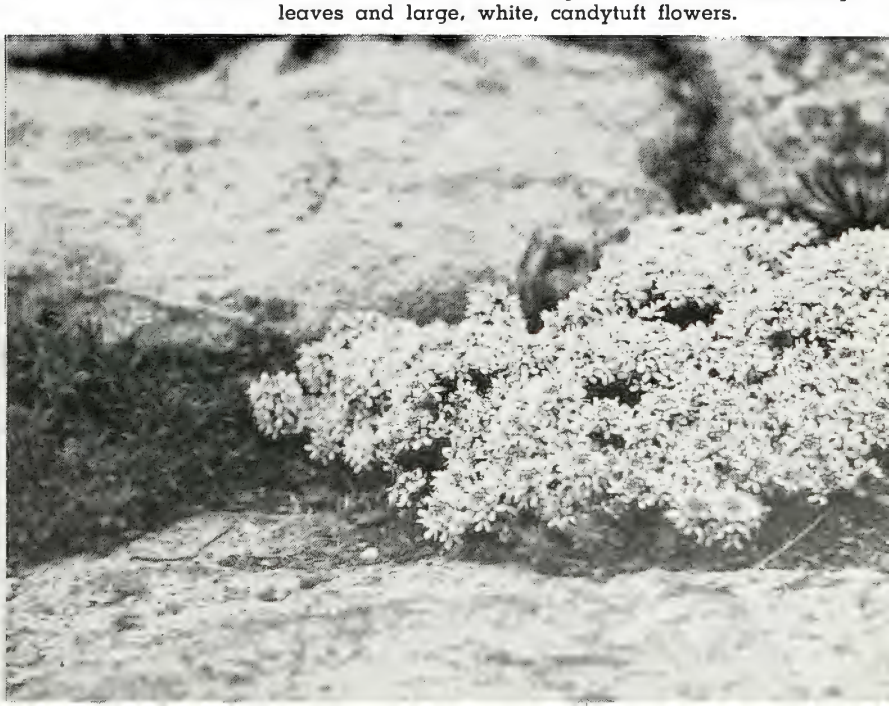
Sedum cauticolum from Japan is a very desirable wall plant; tucked in a crevice, it will be quite content. Dense clusters of red flowers are at their best in early fall.

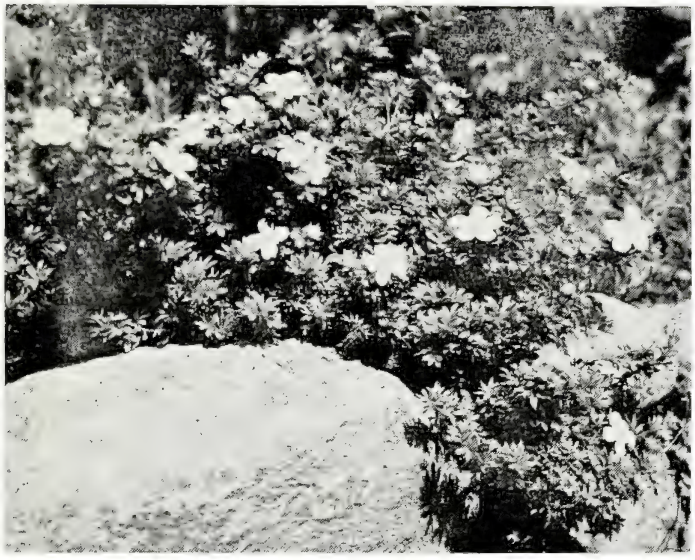
Wall plants tend to fall into several overworked groups —phlox, alyssum, sedum. By all means use some of these old reliables, but look into some of the other species available. The genus *Potentilla,* for example. This group of sun-lovers is easy to grow and flowers freely. As a plant it forms attractive carpets of shiny, parted leaves, some species having silky hair, and the flowers are usually shades of gold and yellow. *P. alba* and *P. tridentata* produce white flowers practically all summer.

The geraniums are another valuable asset, because, in addition to being profuse bloomers, they are at their zenith when the first flush of spring color is fading. For the larger expanses of wall gardens these cranebills are very satisfying. The delightful pink of *G. lancastriense* and its white partner *G. sanguineum album* quickly cover a bare spot. *G. subcaulenscens,* with its bright carmine-magenta, black-eyed flowers, is most appealing. Veronicas and campanulas will supply the blue tones. *V. rupestris* is a strong-growing

ere, is clothed with mats of dark, oaklike leaves and
ed by fluffy seed heads.

Iberis pygmaea, difficult to track down, seems to be a horticultural form of *I. saxatilis.* It has flat, gnarled branches with tiny leaves and large, white, candytuft flowers.





Upper left, *Gypsophila dubia,* an uncommon plant, has a tidy habit and grows quite easily in full sun. Its white flowers, flushed with pink, are set against dark foliage.

Upper right, *Draba sibirica* forms a carpet of tiny, bright green leaves which is completely hidden in early spring beneath a dancing mist of yellow flowers.

Lower left, *Potentilla farreri prostrata,* is a choice form of *P. fruticosa.* Its branches tumble gracefully over a wall in full sun. The bright golden flowers are in evidence from June to October.

species, with deep blue spikes; *V. cinerea* has contrasting gray leaves and almost woody stems, and light blue flower-spikes; V. *armena,* a trailing, low plant, has exceedingly bright blue flowers; *V. pectinata* is a fairly rampant, ground-hugging plant with toothed leaves, which is saved from being ordinary by its bright blue flowers. Of the lovely bellflowers I could write pages. Happily they seem to prefer the cool root-run of a vertical wall. You cannot go wrong with such plants as *C. carpatica* (quite large), *C. elatines,* and the Dalmatian bellflower, *C. portenschlagiana* (*C. muralis* of old).

Many bright and cheerful colors can be introduced for the summer days by planting some sun-roses in a sunny spot, less exposed to winter winds. Helianthemums, as they are botanically known, are not roses; they belong to the *Cistaceae* or Rock-rose Family. They form evergreen bushes which bear numerous flowers shaped like a single rose, a fresh crop every day. Varieties to look for are 'Supreme', dark red; 'Mrs. Earle', double red; 'Wisley Primrose', primrose; 'Jubilee', double, primrose-yellow; and 'Eglantine', large, silver-pink flowers with silvery foliage.

On the shadier side of the wall try a few of the silver saxifrages. The aizoon group makes a good beginning; there are diverse forms from which to make your selection, and they are not too demanding. All have crisp rosettes of toothed leaves, beaded to varying degree with encrustation. *Saxifraga aizoon rosea* has pink flowers in eight-inch arching sprays; *S. aizoon lutea* has pale yellow flowers; and *S. aizoon* has the more typical white sprays. One or two plants of *S. cotyledon* with its large, green rosettes will add interest by contrast with the aizoon group. When the immense two-foot, red-stemmed sprays shoot forth, stand by for comments!

For the raised-bed portion of the wall there is an almost limitless choice of plant material. The dainty, jewel-like plants of the smaller varieties of androsace, draba, hutchinsia, and erinus allow you to have a whole garden in even the smallest corners. Groups of early spring bulbs, irises, crocuses, snowdrops, should be dotted about, but keep in mind the relatively untidy foliage which follows the blooms. Instead of the familiar gray-green mats of the more familiar kinds of dianthus, try *D. alpinus* whose neat cushions are covered with short-stemmed, large, deep rose-pink flowers, also *D. neglectus* whose rose flowers have an unusual buff reverse. Or plant the emerald-green mounds of tiny drabas, pincushioned with delicate flower-stalks which are topped by bright yellow flowers. Here are a few: *D. rigida, D. olympica, D. aizoides,* and *D. alpina. Silene acaulis,* which hails from our own mountain ranges as well as those of the Old World, should be included in all alpine gardens. Its hard, green cushions studded with pink stemless "catchfly" flowers portray a high mountain atmosphere. So it goes—the endless variety of alpine dwellers would fill a book, as indeed it has —many! If you'd like to pursue this subject further, read *Rock Garden Plants* by Clarence Elliott or T. C. Mansfield's beautifully illustrated book *Alpines in Colour and Cultivation.* They are guaranteed to excite you. The hobby of alpine gardening can open up many avenues. You may become an amateur botanist, a book collector, a photographer, and a world traveler.

ITER AZORICUM

By Pierre Dansereau

Cais do Pico
June 15, 1964

Dr. Kornelius Lems
Goucher College
Towson, Maryland, U.S.A.

Dear Kees:

Here is the latest from our beloved Macaronesia!

It is a lovely day as I look out to sea from the veranda. The whale factory is dormant for the moment and the yards and the wharfs are clean and the men are busy refurbishing their harpoons and polishing their craft. The women are knitting those marvelous socks which are their specialty. The neatly imbricated black lava-rock walls are covered with flaming red roses. And high, high above, in the background, the peak of Pico is to be seen and my companions, Antonio Pinto da Silva, Bento Rainha, and John Milton are climbing it. And why should I be left behind, writing instead of climbing? It is a sad story. A victim of persisting juvenile enthusiasm, I took a wild leap into a heaving dory at Corvo the other day and have a stiff leg (a "Charley-horse"?). So I sit at the *pensão,* my antiphlogistically bandaged leg outstretched, and enjoy the company of my wife and of Quitéria Pinto da Silva and of the numerous women of all ages who run this establishment and whose housekeeping and cooking are excellent. Maybe I shall never climb the highest peak in the Azores, not having climbed the highest peak in the Canaries for similar reasons. And Rouwenzori! So Moses? But I am not the leader of a people; so who cares?

In fact, this is a good time to give you a few preliminary thoughts on these islands or at least to put you up-to-date on my adventures. I am including the map that gives you our itinerary so far and to come.

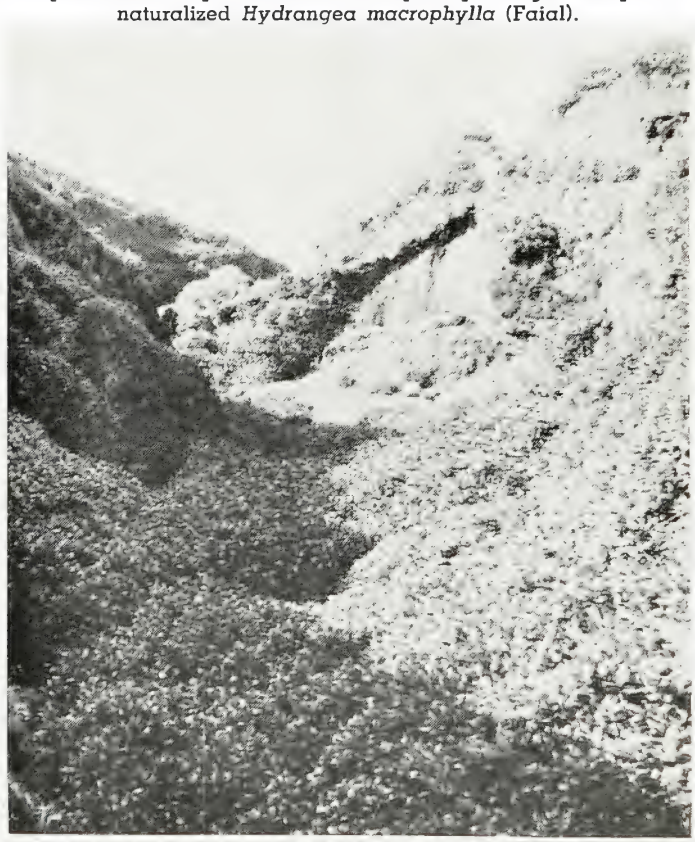
The Azores are unquestionably less "fortunate" than the Canaries, if you look to a sunny climate for a happy time. Here prevails the wetness of the *laurisilva* (more likely the *laurifruticeta*!). Although the lowlands, in all these islands, are fairly moist and warm, the cloud bank that so conspicuously hems in the laurel strip in the Canaries very largely prevails above three hundred meters whatever the topography. Even on Pico there is no rain shadow and even less of a coastal desert. Xerophytic formations are strictly edaphic. What I have seen to date has convinced me that there are important differences between the Azores and the rest of Macaronesia. This is not unexpected, of course, since this archipelago is the terminal point of the macaronesian migration.

Virginia Weadock will have sent you the account of my first two weeks in these islands and maybe some of the pictures I have taken. Up to June 3rd I had seen two islands, Santa Maria and Terceira, and now I have set foot on six more: Graciosa, São Jorge, Faial, Pico, Corvo, and Flores. We shall be spending some time on São Miguel later, thus completing the cycle (see map).

We sailed from Angra do Heroismo at midnight on June 3rd, on the S. S. Ponta Delgada. There was a good deal of rocking during the night, which, as you know, makes me very happy (maybe because I have retained so much childlike delight in seeing others suffer, would you say?). We were still pitching wildly when came the dawn, at which time I was up on the bridge, anxiously awaiting my cue to go ashore. We were at Santa Cruz de Graciosa, but anchored offshore for there is no real harbour here. It is the lowest of the islands and it surely looked very bleak in the morning rain. Our seamen were making desperate maneuvers to lower the gangplank so that the land "authorities" could come aboard. These men were standing imperturbable in their heaving launch. Not so our pyjama-clad, blue-robed, unshaven skipper, barking orders. The wind, the saltspray, the gulls, the waves all seemed to answer him. He commands and all goes smoothly in a chaotic way.

I barely have time to rouse John and, breakfastless, we stagger down in the prickly rain and the launch bounces off the side of the ship and off to shore. We jump off onto the lava-rock embankment and dash for a taxi. There are only two or three on the island and the returning local passengers have taken them. But, as is usual in these islands (and indeed in Portugal itself), someone is concerned. Sr. Picanço, harbour official and carpenter, finds a cab and accompanies us. We rush through the village to the Pico da

A pastured valley (Fontainhas) completely overgrown by the naturalized *Hydrangea macrophylla* (Faial).



Trees killed by the volcanic ash; regenerating giant-reed and disabled lighthouse at Capelinhos (Faial).

Recent pahoehoe lava at Capelinhos, partly covered with volcanic ash, on neither of which any plants have grown since the eruption in 1958 (Faial).

Ajuda, a double-crested hill with two churches, white and blue like the hydrangeas which have run wild all over. Also, the tree-of-heaven-that-grows-in-Brooklyn and the inevitable Australian incenso *(Pittosporum undulatum)* and some dark red *Centranthus* and banks of pink *Galactites*. All this colour and the shine of wet foliage, and the impassive wind-sieve of *Araucaria excelsa.*

The urbanity of our chauffeur and our guide, their sweet attentiveness, are very soothing in this horizontal rainstorm as we drive through the countryside, alerting ducks and dogs which dodge into tamarisk hedges. These are used as windbreaks and are also planted in the *baldios* so as to make fuel available. The vineyards are small and look unstable (compared to those of Santa Maria and Terceira), exposed to windblown sand. They grow potato, sweet-potato, and a large-leaved open cabbage *(repolho)*. Inland, maize, wheat, a better quality of vine, and some barley.

What delight there is in artisanship, here! A curious byzantine-roofed windmill is made of locally grown red *Cryptomeria* wood, but the wings are of imported oak. (The oaks really do not grow well in the Azores. As I remember, they are not much at home in the Canaries either.) A lava-stone hangar is closed by a swinging door of latticed white strips of *olmo* (probably *Celtis australis*) and red bands of tamarisk.

Sr. Picanço leads us to the lighthouse, a white tower, like a candle on the black salver of lava. We look down upon wave after wave of rolling black bursting to white foam and flowing back in green vitreous tongues. Terns piercingly zigzag, as it seems against the rhythm of the swirling air, while gulls serenely drift. The lighthouse-keeper, whose establishment is immaculate, looks out indulgently upon such fury and grace and takes us down to his workshop to display the fruit of his many leisure hours: his cabinet-work, which follows traditional models, is of exquisite perfection, the texture of the wood transparent through a patient polish where you can almost see the hand's loving labour. It turns out that it is he who sculpted that beautiful ceiling in the "salão nobre" of Angra do Heroismo.

Unfortunately we do not get to see the *caldeira,* as no taxi is in sight. So we repair to a fly-ridden bar and have coffee and bread and wine with the local early birds.

We had to leave Graciosa, still in the rainstorm, without taking any pictures. We were luckier later in the day when we stopped on São Jorge. There was no trouble in getting a taxi at Calheta, and in two hours we had been to Velas and returned to the ship.

São Jorge has its principal towns by the sea, as the other islands do. However, its relief is quite different. It consists largely of a plateau with crumbling edges: high cliffs on much of the periphery and gentler slopes on which the towns are built. The Velas-Rosais area has suffered severely from this year's earthquake: some nine-hundred houses destroyed. Rebuilding has begun, but many ruins are still in evidence. São Jorge cheese, which is exported even to America, is delicious, a great favourite with our party. Enough maize is also grown for export as well as wheat, but potatoes and sweet-potatoes are for local consumption.

I can hardly describe the São Jorge landscape, for we drove through an unending mist as soon as we reached the three-hundred-meter level. All we could see was the running hedge of *Hydrangea* on the roadside. This island and São Miguel have latifundia, in contrast to the other islands, and some of the (absentee) landlords have beautiful gardens and nice-looking houses.

It was good to get back to the S. S. Ponta Delgada, after all that rain and mist. As a matter of fact, life aboard is most pleasant, thanks to the commander, Captain Armando Soares. In the early morning, the ruddy skipper shouting orders; at lunch time, the courteous, soft-spoken official; at dinner, the suave man-of-the-world, a reader of French literature, a brilliant conversationalist in French, English, Portuguese.

Our arrival in Horta, capital city of the Island of Faial, was rather a let-down (the only one so far). The rooming-house turned out to be rather dingy, the "dona de casa" a sloppy housekeeper. And it was dark, and it rained, and rained. We had a very large room with several high windows looking out to the harbour. That first morning the water reflected the steel-gray sky, but a clearing in the mist revealed the purple cone of Pico across the strait. In sight of this great mountain, we had good coffee and rolls served by a solicitous barkeeper who gave us a great deal of mildly credible information on the island and on himself and his family. We took our other meals mostly at a private club, called "Amor da Patria," which gave us excellent food and wine.

We spent many hours in the caldeira and on the recent volcanic flow, and I shall tell you about that presently, but

Juniperus brevifolia and *Deschampsia foliosa* in the caldeira (Faial).

Marshland of rushes on the floor of the caldeira, with *Erica azorica* scrub hammocks (Faial).

what I shall always remember most vividly about Horta are my early morning wanderings.

I was usually down on the street at about six o'clock. A quiet gathering of forces was marked by footsteps on the shiny cobblestones of the winding streets which pour down onto the praça. The slanting light would strike the sidewalk tables of the little bar where I got my first cup of *café com leite.* At the bakery next door, fresh, fragrant rolls were being poured into large wicker boxes for door-to-door distribution in the town. Barefoot fishermen, a long pole on the shoulder, balanced two basketsful of silvery fish. The last ones to emerge on the embankment came at a rhythmic trot, zooming past the old ladies in the black shawls walking towards the sound of the church bell. The dark, dense New Zealand ratas *(Metrosideros umbellata),* casting their shade on the black-and-white mosaic of the square, were beginning to flash their brushlike scarlet blossoms. Conversation with the barman was free-and-easy, as it was in the other cafés where I stopped later for more coffee and where I met lawyers, customs officials, shopkeepers, and high school boys and discussed resources and education, the contrariness of parents and politicians and so on. But the most congenial spectacle was the fish market. I had watched the men and boys gathering *minhoca* (sea-worms) for bait among the black intertidal rocks and had asked them the names of the fish. The *abrotea* is like cod but finer-textured; there are diamond-patterned, yellow-brown-and-black eels, bright red fish, and *chicharros* (like smelts), large *bicudas* (an inoffensive(?) barracuda), and many others. And also blue crabs and purple lobsters and large limpets *(lapas)* which are quite good to eat, although they stick their horns out at you! The Mediterranean custom of bargaining (fishmongering?) is carried on at a high pitch, even by very respectable people (= dressed in bourgeois clothes) carrying plastic bags.

A very old specimen of cedro *(Juniperus brevifolia).*

The town forms a long curving line along the waterfront. A newly installed mosaic walk tops the jetty. The coloured stucco houses form an unbroken façade except for an occasional white-and-blue church or the spire of a tall araucaria. The old Victorian mansions are up on the hill: many have belonged to British or American families long established here but virtually extinct now. I would come back from the market along the jetty and meet the rushing tide of the first school children, needlessly, breathlessly running. Such was the poetic preface, every morning from 6 to 8, to my day's work in Horta.

Our excursions out to Capelinhos were like going to the moon. Through many tidy, good-looking villages along the south coast, flowers in the gardens, houses well-kept. At Capelos, the red or black earth turns a cinder-gray and houses are abandoned and broken skeletons of trees are twisted and wisps of buried giant-reed emerge. Looking up and beyond, you see the several folds of the new hills which arose out of the sea in 1957 and 1958. A small museum displays a collection of photographs and specimens and some publications on this well-studied eruption. The magnum opus is by A. de Castelo Branco and his collaborators: "Le volcanisme de d'Ile de Faial et l'éruption du volcan de Capelinhos" (Serviços Geologicos de Portugal, Memoria 4:1-104. 1959). A good account has been given by my former colleague of Cranbrook, Michigan, Dr. Willard H. Parsons (Cranbrook Institute of Science News Letter, 28 (2):10-21. 1958).

Macaronesian woody plants, showing distribution and approximate maximum height (in meters). Species in parentheses are probably not native.

GENUS	Azores	Madeira	Canaries	Europe
JUNIPERUS	oxycedrus ssp. brevifolia, 5	oxycedrus ssp. maderensis, 4-7 phoenicea, 7	oxycedrus ssp. grandifolia, ? phoenicea, 7	oxycedrus ssp. oxycedrus, 4 phoenicea, 7
LAURUS	azorica, 7 (canariensis), 7	canariensis, 20	canariensis, 20	nobilis, 15
OCOTEA	(foetens), 10	foetens, 15-30	foetens, 20-30	
PERSEA	(indica), 10	indica, 25 (gratissima), 8-15	indica, 25	
APOLLONIAS	(canariensis), 3	canariensis, 10-20	canariensis, 10-20	
ERICA	azorica, 6	scoparia ssp. scoparia, 1 arborea, 6-12	scoparia ssp. platycodon, 2 arborea, 8-10	scoparia ssp. scoparia, 1 arborea, 3-5
ARBUTUS			canariensis, 6-8	unedo, 6-8
VACCINIUM	cylindraceum, 6	maderense, 6		myrtillus, 0.5
CLETHRA		arborea, 5-8	(arborea), ?	
MYRICA	faya, 8	faya, 15	faya, 20	faya, 20
MYRSINE	africana var. retusa, 3		canariensis, 6-8 ?	
PRUNUS	lusitanica var. ?, 3-6	lusitanica var. ?, 10-20	lusitanica var. ?, 10-20	lusitanica var. lusitanica, 8-12
ILEX	perado ssp. azorica, 6	perado var. perado, 2.5	perado var. platyphylla, 15 canariensis, 6-10	perado ssp. ?, ? aquifolium, 20
NOTELAEA	azorica, 7	excelsa, 15	excelsa, 10-20	
RHAMNUS	latifolia, 3-5	latifolia, 6-10	glandulosa, 3-6	frangula, 2-3
ARDISIA		excelsa, 10-20	excelsa, 10-20	

Bracken fern; vineyards, village of Candelaria; Pico, the highest mountain in the Azores, 2345 meters (Pico).

And so we began to walk, often ankle-deep in the light cinder which varies from a powdery to a sandy texture. The dominant landmark is the standing ghost of the lighthouse, its inside destroyed, its windows gaping, its pointed cap dented, but its carapace solid, dull white against the purple-gray of the rising mounds which shut it off from the sea to westward where its beam used to flash. (Now, it could no more be a lighthouse than the Saintes-Maries-de-la-Mer a port-of-sea!)

Presently we have passed the last struggling buried reeds and the last battered heather, and the cinder spreads a velvet carpet under the projecting smooth, stripped, polished, Dali-esque dead trees. A great sterile valley and rising hill have been planted in squares eight by ten meters: a gigantic but bedraggled checkerboard of *Arundo donax,* the tufted canes with small, green pennants of leaves windblown and torn. But alive and holding that stern straight line, thanks to its thick rhizomes. The tamarisk, on the contrary, has died. This pathetic attempt to reclaim a once rich vineyard has an uncertain future.

But now, crossing the ridge of the former shoreline and plunging into the new territory, an extension of the island westward, a great bed of coruscated lava coils southward to the sea, parallel to another one (of 1672) eastward. The old basaltic cliff (with a clinging emerald clump of *Crithmum*) dominates the landscape, and ashes in great banks have formed new high, as yet uneroded beaches and filled the lagoons which had developed during the encircling progress of the lava flows. A climb to the high point of the new hill is on biscuit-like aa, and there are many small and large nucleated "bombs" scattered all over by the explosions (one is on my table right now, a porous bit of litho-pastry which serves well as a paperweight). Presently the ground is hot under my rubber-soled shoes and sulphurous gas escapes the puffing vents.

Plants? There are no plants at all. None on the dry-as-dust cinders, none on the aa (not even *Stereocaulon*), none on the twisting ropes of the pahoehoe. No life? The gulls do scream and plunge away to sea, one by one, on the south side. But the terns! We come upon a colony of several hundred in a fold of sharply ridged aa lava. Quitéria picks up a downy chick in her hand. Others are emerging from the spotted eggs. The whole population, much disturbed, flies and circles and calls. (Their Portuguese name is *garajau,* which seems appropriately raucous.)

Two or three times my companions were out of sight. The hard blue skin of the sky above them seemed to resound like a drum. The stones rolled and crackled and the infernal breath of the volcano came through the red nostrils of small vents in tiny gasps. Can you go to heaven on the wings of a tern?

I interrupted this letter, Kees, for lunch. And what a splendid lunch it was too! Some day when you cannot climb a mountain, treat yourself to a glass of Madeira wine, to Portuguese cabbage soup, to lobster, and then have some good red native wine with your São Jorge cheese, and finish off with fresh São Miguel pineapple.

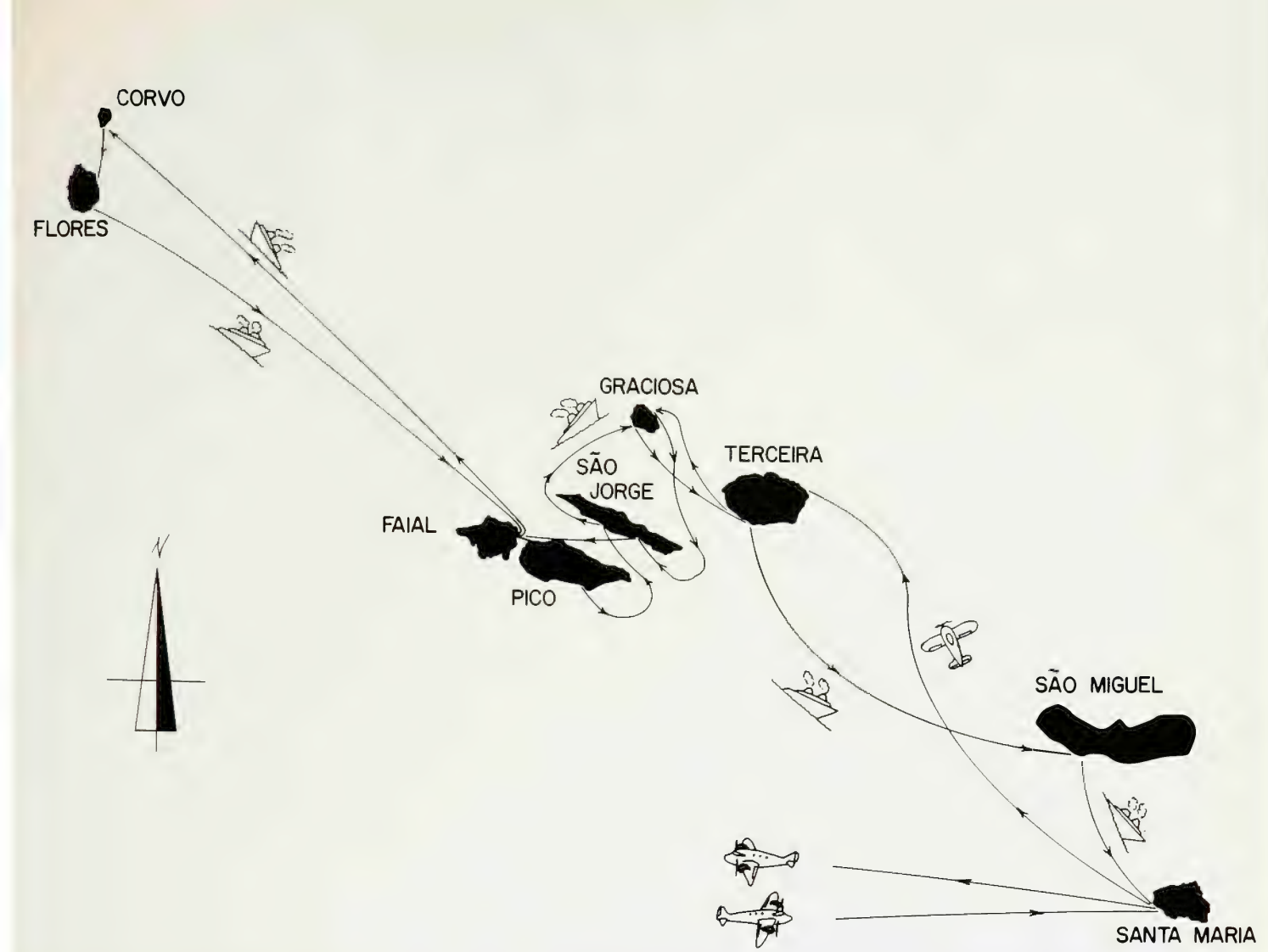
But now to more serious matters. If I tell you about the caldeira of Faial, I shall have to tell you almost all I have learned concerning the vegetation of the Azores so far. Of course, we can only begin to understand what goes on here by referring to the larger scheme of Macaronesian vegetation as a whole. You will probably agree that Tenerife provides the prototype. At least I have found it useful to follow the scheme proposed by Ceballos and Ortuño in 1951.* Herewith is my version, in table form, of the eleven major vegetation zones of Tenerife, and of their correlation. This is a very rich repertory of major plant-communities and some of the elements present in practically all of the eleven zones are to be found also in Madeira and in the Azores. However, I do not think that more than three or four well-marked climatic formations are to be seen on either Madeira or the Azores. The lowlands and hills of both these archipelagoes originally harboured some kind of laurel-dominated vegetation. I have seen beautiful, tall, dense stands of laurel-avocado-holly in Madeira. As for the cedar (= juniper) zone that would normally occupy a higher altitude on that island, it has been completely destroyed by man, and the heath that comes above that is also very much transformed. Madeira is not high enough (only 1920 meters) to permit other formations of colder affinity and not warm-and-dry enough at sea level to harbour a full-fledged zone of palms, succulents, and spiny scrub.

As for the Azores, very little intact woody vegetation (I am avoiding the use of the term forest: see below) has persisted. *Ocotea* and *Persea* may very well not be native! *Myrica faya* is by far the most conspicuous lowland woody plant and it forms solid and permanent stands. At three

The rounded, wind-sheared *Erica azorica* heath in the highlands of Flores.

The principal zonal formations in the Canaries and some of their correlations and affinities.

Formation	Local name	Dominant plant	Altitudinal Limits on Tenerife (m) NNE	SSW	Dominant life-form	Dominant floristic affinity	Climate
11 Pseudo-alpine desert	pico	Viola cheiranthifolia	2690-3530	2690-3530	chamaephytic herbs	North African	subcontinental cool-to-cold, dry
10 Montane open scrub	retamal	Spartocytisus nubigenus	1980-2690	2000-2660	leafless shrubs		
9 Montane dense scrub	codesal	Adenocarpus viscosus			leafy shrubs	North African-Mediterranean	
	escobonal	Cytisus proliferus					
8 Pine savana	pinar	Pinus canariensis	1030-1980 1300-1860	630-1860	needle-leaved trees		fluctuating, dry
7 Heath-scrub	brezal	Erica arborea	970-1300 910-1030 820- 880 460- 560 400- 510	810-2200	heath	African Montane, Mediterranean-North Atlantic	somewhat fluctuating, humid
6 Savana-heath	fayal-brezal	Myrica faya Erica arborea			broad-leaved, evergreen small trees shrubby heaths		
5 Temperate laurel rain forest	bosque	Lauraceae	560- 910 510- 970 330- 820		broad-leaved evergreen trees	South European Tertiary	very equable, wet
4 Juniper savana	sabinar	Juniperus cedrus		200- 630	needle-leaved small trees	Mediterranean North African	strongly fluctuating, warm
3 Desert succulent scrub	matorral	various succulents	0- 460 0- 400 0- 330	0- 810 0- 200 0- 520	candelabra-like succulent shrubs	Tropical African	very warm, dry
2 Desert spiny scrub	xerofilo	various small-leaved and spiny shrubs			small-leaved, spiny small shrubs		
1 Palm brake	palmar	Phoenix canariensis			rosette trees		



Iter azoricum, 1964.

hundred meters, it tends to disappear and laurel *(Laurus azorica)* takes over. Above seven hundred meters, cedar *(Juniperus brevifolia)* is more abundant. And above that, two more zones: an ericaceous scrub zone *(Erica azorica)* from about twelve hundred to sixteen hundred meters, and a heather-thyme tundra, with *Calluna vulgaris* and *Thymus cespititius.* (Attention! these are vegetation zones and do not indicate the altitudinal limits of any of the species mentioned, only their position as dominants of mature, presumably climax, vegetation.) I am hoping that Antonio and John will return with some good pictures and notes from their expedition to Pico, so that we can improve upon the very sketchy account of altitudinal vegetation provided by previous investigators and most recently by Marler and Boatman in the *Journal of Ecology* (**40**:143-155. 1952.)

But there is a further question which deeply puzzles me: the apparent absence of true forests (consisting, according to my definition, of close-growing woody plants taller than eight meters!) in these islands. I have made an attempt to line up the key species, subspecies, and varieties that are involved in the macaronesian mesophytic woody complex on a table which I include herewith. You will note that the same species or its close relative does not often grow to the same maximum size in the Azores as it does elsewhere. Can this be due to an "unfavourable climate" in the Azores, as compared to Madeira and the Canaries? Certainly *Araucaria excelsa, Eucalyptus globulus, Pinus radiata, Sequoia sempervirens,* and others do grow to tree size and at a relatively rapid rate! Or else, do the Azorean plants all belong to dwarfed physiological races?

The further speculation I am led to concerns the low efficiency of native woody plants as compared to introduced ones in oceanic islands generally. Thus, in New Zealand where native trees do attain a great size, they are far outstripped in rate of growth by Monterey pine, eucalypts, and other exotics. Is it therefore the genetic depauperation of (oceanic) island floras that is to blame? If you have some good ideas on this subject, let me know. I may be able to use them as I have used many of your criticisms and queries before! I am thinking of presenting a paper along these lines in Madrid, at the XXVth Anniversary Symposium of the Consejo Superior de Investigaciones Cientificas.

But, enough for now, I must rest my arm and exercise my foot. After all, I may climb that mountain yet!

Yours as ever,
Pierre

*L. Ceballos y F. Ortuño. Vegetación y flora forestal de las Canarias Occidentales. Instituto Forestal de Investigaciones y Experiencias. Madrid. 465 pp. 1951.

TREASURES OF THE GARDEN'S HERBARIUM IV

The Collection of William Marriott Canby

By Rupert C. Barneby

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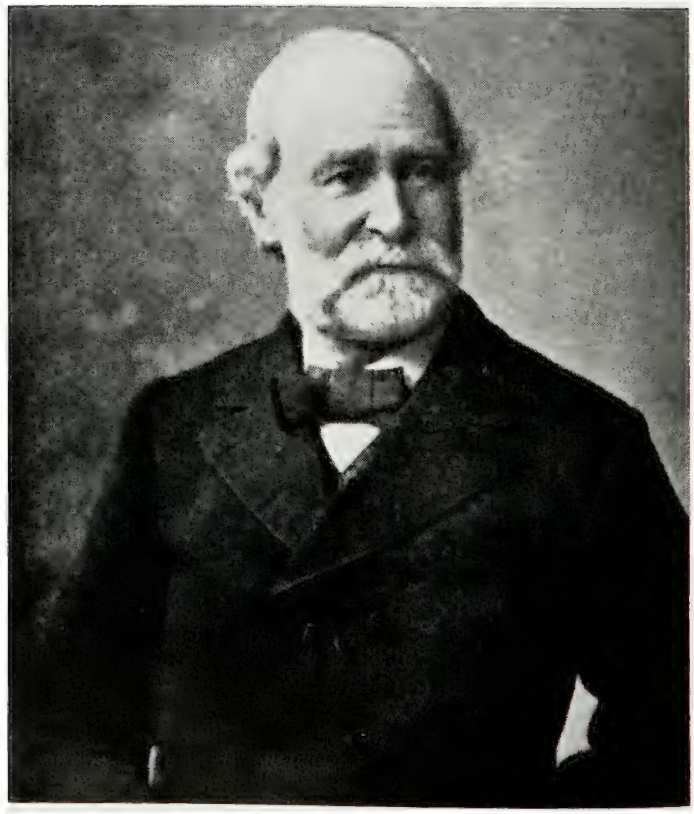
The oval stamp reading "College of Pharmacy Herbarium. Deposited 1945 in The New York Botanical Garden," which may be encountered repeatedly among the phanerogams and vascular cryptogams of the Garden's Herbarium and may be descried at the bottom of the sheet illustrated, is more often than not misleading. In fact, all specimens so stamped, with the exception of H. H. Rusby's South American plants (with which we must associate sets of Bang and Mandon), really originated in the herbarium of W. M. Canby. Strictly speaking, the College of Pharmacy collection was built up by Alfonso Wood. It was relatively small, poorly prepared and mounted, and of only little value except for historic associations. This herbarium, also now part of the Garden's general collection, is separately stamped as the Alfonso Wood herbarium. The Canby herbarium was acquired for the College in 1893 by H. H. Rusby for the nominal price of three thousand dollars. It was housed in the College's then new building on West 68th Street in the City of New York and remained there in its original covers, seldom visited and consulted by few, until 1945, when the College transferred it on permanent loan to the Botanical Garden. Technically speaking, then, it is the College of Pharmacy Herbarium, but its original creator should not be passed over or forgotten.

William Marriott Canby was born in Philadelphia on March 17, 1831, of a Quaker family long established in Wilmington, Delaware, originally from Yorkshire in England. As a youth he worked on a farm in Pennsylvania, but in young manhood settled in Wilmington where he quickly became a leading citizen, rising to the presidency of the Delaware Western Railroad and to directorships of banks and other enterprises. He had been interested in botany from early years, and he attained a deep and detailed knowledge of the flora of the eastern seaboard. By all accounts he must have been a singularly delightful and generous personality, universally loved and respected. He counted among his close friends Asa Gray and Charles Sprague Sargent, and late in life he became well acquainted with a new generation of botanists such as J. N. Rose and H. H. Rusby. Canby traveled widely in eastern United States and also visited Colorado, California, and Washington. Plant material collected on these trips was shared primarily with Gray but was also used for exchange purposes, and he conducted a correspondence with botanists all over the United States and Europe. The main body of his herbarium was built up, nevertheless, chiefly by direct purchase or through shares in the spoil of expeditions or individual collectors which he helped finance. Apparently it was Canby who made possible Parry and Palmer's extraordinarily rich Mexican collection of 1877, but the full details of his activities in this field are not known. Canby wrote little, though certainly not lacking in ability, as shown by his observations on carniverous plants which were used and acknowledged by Darwin. His botanical lifework was his herbarium, all mounted, arranged, and maintained by himself. When received here at the Garden, it was still ordered up in the original genus-covers annotated in Canby's fine and clear handwriting, and its immaculate condition speaks eloquently of the love and care expended upon it.

No detailed record of the growth of Canby's herbarium is known to exist, and a full description of it would be tedious even if it were possible. We do not even know its true size, partly because there was much doubling up of collections on the same herbarium sheet, and a simple count of sheets is therefore irrelevant. In 1892 Rusby estimated that it contained thirty thousand species and perhaps five times as many separate collections. Whatever the exact total may have been, Canby's herbarium eventually became the largest and most important ever held in private hands in North America. Its nucleus was collected by Canby himself in 1858 on a trip to Florida, where he had gone in search of relief from a bronchial affliction. Within the next thirty years, during which time it had grown to such proportions that it threatened to take over his entire home in Wilmington, it was said to have incorporated every addition "which enterprise or money could secure." Seldom have enthusiasm and a fortune been put to better use.

The caliber of the herbarium, when examined in detail, is of extraordinarily high quality. The least interesting and

William Marriott Canby. From Harshberger: *The Botanists of Philadelphia and Their Work.*



The sheet of *Canbya candida* from Canby's herbarium. The packet at bottom left is an isotype, a duplicate of Edward Palmer's original discovery in May, 1875. The packet at lower right contains plants collected by Parry and Lemmon in 1876. Top left, a later (May, 1880) collection from Lemmon. Upper right, Sprague's beautiful drawing that accompanied the original description. Middle left, a package of letters from C. C. Parry, Asa Gray, and John Gill Lemmon pertaining to the discovery, habitat, and publication of the species. The fine copperplate handwriting on this package is Canby's.

least valuable items are derived from rather numerous *exsiccatae* illustrating the European flora. These collections, many of which were prepared for sale in Germany during the nineteenth century, were aimed at the amateur who might add a rare violet, for example, to his cabinet of specimens in much the same spirit that a philatelist pastes into his album a three-cornered Cape of Good Hope. They were used also in botany classes, but generally lack data of locality or collector, and are of no scientific value today. These form only a small percentage of the whole and do not dim the luster of the main collection.

Among Canby's first purchases was a set of the plants collected by Parry, Hall, and Harbour in Colorado in 1862. From that point onward, Canby received sets from most of the important collectors in the United States, especially west of the Mississippi. I need only mention such names as Kellogg and Bolander in California, Elihu Hall in Texas, Curtiss and his correspondents in the Southeast, and the four P's, C. C. Parry, Edward Palmer, C. G. Pringle, and S. B. Parish in the Southwest and Mexico. Asa Gray, who was not only the pivotal figure during the period in North American botany but was also in touch with the Hookers, DeCandolle, and other botanical eminences abroad, was

Canby's most important contact and most prolific source of treasure. It was through Gray that Canby received duplicates of many collections from the Railroad Surveys. At the death of William Sullivant in 1873, Gray became trustee of his botanical estate and passed on to Canby all Sullivant's extra North American phanerogams. Through this path Canby acquired much valuable Boissier material from Spain and the Orient, important sets of Italian material from Tenore and Gasparrini, a sprinkling (rich in isotypes but often fragmentary) of the pioneer collections of Ledebour and Bunge from Altai, and an extensive representation of the Chilean flora (unfortunately badly labeled "Chili" without further data) thought to have been collected by Bridges and Cuming. It was by direct purchase that Canby added Fendler's collection from Trinidad, two thousand Cuban plants from Charles Wright, a set of Sintenis from Puerto Rico, J. G. Lemmon's gatherings from Sierra Valley, California, and others too numerous to list here. Important acquisitions from abroad were a set of Vieillard's New Caledonian plants bought from René Lenormand, and collections of unknown (but certainly considerable) scope from Australia and New Zealand collected by Baron von Mueller and Cheeseman.

Apart from his numerous collecting trips in the East and those already mentioned to California and Colorado, Canby was directly involved in only one major botanical reconnaissance, the so-called Northern Transcontinental Survey (1882-3) undertaken and then prematurely abandoned by the Northern Pacific Railroad. Canby organized the botanical exploration and engaged as collectors T. S. Brandegee, already well-known for his work in southwestern Colorado, and Frank Tweedy, who became better known subsequently. The collections of Brandegee and Tweedy, made separately and together in the Columbia Basin, were shared between Gray, Canby, Brandegee, and the National Herbarium. Unfortunately, few of the specimens are fully labeled as to locality and even the collectors' itineraries are unknown.

The addition of the Canby herbarium to the general collection at the Garden, which was completed in 1964, after many years work, naturally introduced considerable duplication into our holdings. The Canby material of many classic collections was, however, untouched and even unseen for fifty or sixty years, and had remained in mint condition, in contrast to the shopworn and worked-over state into which the often-handled duplicates from other sources had fallen. In effect, the Garden acquired a whole new set of isotypes of the majority of collectors active in the United States during the decades 1858-1888, a period which witnessed an unequaled activity in plant exploration in the West. Apart from its other wealth, the Canby herbarium is valuable for this enormous deposit of isotypic material.

Canby's name is permanently associated with many plant species, among them an *Angelica,* an *Astragalus,* a *Crataegus,* and the attractive little shrub *Pachystima Canbyi* Gray, sometimes seen in gardens. Three of Canby's closest friends and botanical associates collaborated in naming for him the genus *Canbya.* The original species was discovered by Edward Palmer, dedicated to Canby by C. C. Parry, and actually described by Asa Gray. The obviously treasured sheet of *Canbya candida* from Canby's herbarium, mounted with correspondence from Gray and Parry in connection with its discovery, is reproduced in these pages.

Standard sources for Canby's life are
Harshberger in Bot. Phila. 278-283 + portrait. 1899.
Rusby in Torreya 4: 52-56. 1904
Rose in Bot. Gaz. **37**: 384-388, including bibliography + portrait. 1904.
Rusby in Bull. Torr. Club **19**: 336-339. 1892. Description of Canby's herbarium.

MUSHROOMS IN THE MAILBOX (Continued from page 154)

Table 1. —*Classification of Philatelic Fungi*

ASCOMYCETES
PEZIZALES
HELVELLACEAE
Morchella conica — morel
Romania-1L (fig. 2)
BASIDIOMYCETES
AGARICALES
CLAVARIACEAE
Clavaria aurea — coral mushroom
Romania-10b
BOLETACEAE
Boletus (Krombholzia) edulis — Cépe, Steinpilze
Czechoslovakia-40h; Romania-1.75L; Poland-40gr; Bulgaria-16st; and Russia-6k (fig. 6)
Boletus elegans
Bulgaria-12st
Boletus (Ixocomus) granulatus — granulated boletus
Mongolia-30mg
Boletus luteus — yellow-brown boletus
Poland-30z; Russia-2k
Boletus rufescens
Czechoslovakia-60h
Boletus scaber — rough-stemmed boletus
Poland-5.60z
Boletus (Ixocomus) variegatus — variegated boletus
Mongolia-1T
Boletus versipellis — orange-cap boletus
Russia-10k
AGARICACEAE
Agaricus (Psalliota) campestris — field mushroom
Romania-1.55L; Poland-2.50z; Mongolia-15mg
Agaricus silvatica — sylvan mushroom
Bulgaria-4st
Amanita caesarea — Caesar's mushroom
Romania-20b; Bulgaria-2st
Amanita muscaria — fly amanita
Czechoslovakia-1.40K (fig. 1); Poland-3.40z
Amanita phalloides — "death angel"
Poland-20gr (fig. 3)
Armillaria (Armillariella) mellea — honey or shoestring fungus
Czechoslovakia-1.60K; Romania-35b; Bulgaria-2L
Cantharellus cibarius — chantrelle
Romania-2L; Poland-1z; Russia-4k
Coprinus comatus — shaggymane
Romania-55b; Mongolia-5mg (fig. 5)
Lactarius deliciosus — delicious lactarius
Romania-30b; Poland-60gr; Bulgaria-45st; Mongolia-70mg; Russia-12k
Lactarius scrobiculatus
Mongolia-50 mg
Lactarius torminosis — shaggy lactarius
Mongolia-10mg
Lepiota procera — parasol mushroom
Czechoslovakia-30h; Romania-5b; Bulgaria-80st (fig. 4)
Pleurotus ostreatus — oyster mushroom
Bulgaria-1.25L
Russula delica — white russula
Mongolia-20mg

EVENTS AT THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500.)

EXHIBITION OF FLORA AND FAUNA

There is an imaginative touch to this exhibit, which opened on April 25, 1965, and will continue until November 1, 1965, in the Museum and Administration Building. Groups of animals of different types and the plants to which they gave names are represented.

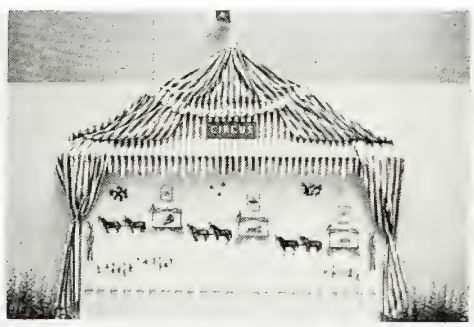
Among birds: wake-robin, *Trillium erectum;* larkspur, *Delphinium exaltatum;* partridge-berry, *Mitchella repens,* and partridge-pea, *Cassia fasciculata.*

Among dragons: green dragon, *Arisaema dracontium;* snapdragon, *Antirrhinum majus;* and dragon's-mouth, *Arethusa bulbosa.*

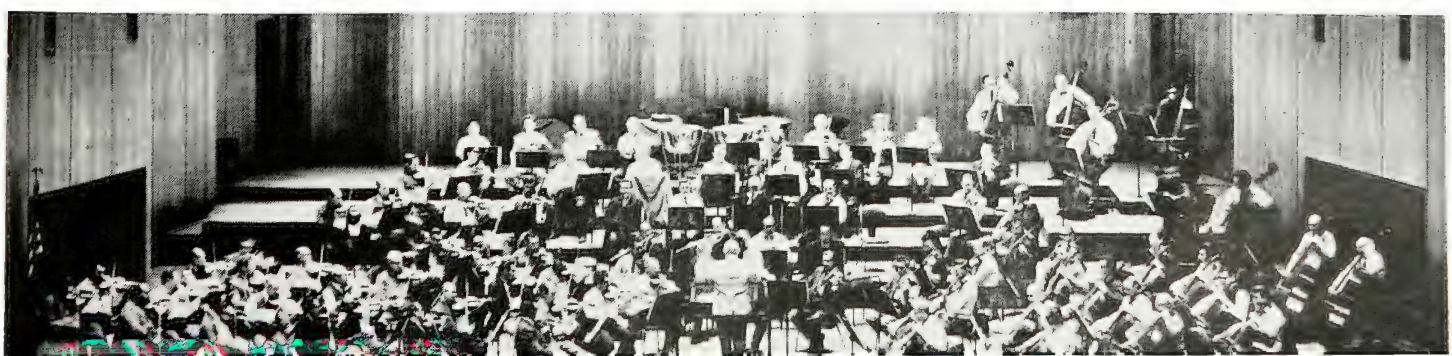
On the farm: colt's foot, *Tussilago farfara;* horse-mint, *Monarda fistulosa;* sheep laurel, *Kalmia angustifolia;* lamb's lettuce, *Valerianella radiata;* goat's beard, *Aruncus dioicus;* and hen-bane, *Hyoscyamus niger.*

At the circus; dandelion, *Taraxacum officinale;* tiger lily, *Lilium tigrinum;* and leopard's bane, *Arnica acaulis.*

The art work, aimed primarily at educating the younger visitors to the Garden's Museum, was done by Mrs. Charles Burlingham, Honorary Curator of Museum Exhibits.



Audiences, which will gather on what is known as Daffodil Hill in The New York Botanical Garden, will hear the New York Philharmonic Orchestra playing from a specially designed mobile stage and acoustical shell in a valley at the base of the grassy knoll.
William Steinberg will conduct the August 14th concert, featuring Beethoven's Ninth Symphony, while Alfred Wallenstein will conduct the performance on August 28. The series of twelve concerts, being held in the five Boroughs, are being presented by the City of New York, the New York Philharmonic, and the Joseph Schlitz Brewing Company. The concerts scheduled for 5:30 p.m., are free to the public.



Lyndhurst in Tarrytown, New York, is a National Trust Restoration by bequest of Anna Gould, the Duchess of Talleyrand-Perigord, who died in 1961. At left, participants in the 1965 Spring Garden Tour of The New York Botanical Garden stroll by the extensive planting of *Rhododendron schlippenbachii*. The spacious lawns are graced by oaks, copper and purple beeches, larches, and other magnificent old trees. At right, the mansion, one of the great monuments of the Gothic Revival in America, was designed by Alexander Jackson Davis, noted exponent of that style. Built in 1838, it has been owned and occupied by three families—the William Pauldings, the George Merritts, and the Jay Goulds.

1965 SPRING GARDEN TOUR

Photographs by WALTER SINGER

The Spring Garden Tour is an annual event
under the auspices of the Volunteer Associates
of The New York Botanical Garden.

Boscobel, an historic restoration of the eighteenth century, stands on a high bluff above the Hudson River in Garrison, New York. This notable country house of Adam-style architecture has been furnished with fine examples of eighteenth-century furniture and exquisite English china, glass, and silver. The expansive lawn, the formal garden, and the brick-path, prize-winning rose garden, designed by Umbuto Innocenti, complements the beautiful mansion.

The several gardens at Stonecrop in Cold Spring, New York, are separated by lattice-work fences, the beds being designed on an angle to tie in with the diamond-pattern of the latticing. (The fences keeps out the herds of deer which are a menace to gardening in that locality.) In the background is the house designed in the French style by George Hickey III—the home of Mr. and Mrs. Francis H. Cabot. The French windows of every room open on lawns or terraces. At right, Rex Murfitt, the manager of Stonecrop Nurseries, and his daughter talk with several visitors. On display in beds, coldframes, pit house, and alpine house were rare and unusual alpines.

Whip Poor Will Farm is the beautiful country residence of Mrs. Vanderbilt Webb in Peekskill, New York. Mrs. Webb is founder and President of American House and the Museum of Contemporary Crafts, and the Founding President of the American Craftsmen's Council. Her artistry is evident in the intimate gardens which surround the two lovely yellow homes nestled against a hill, one behind the other, and connected by a covered walk.

Lower left. A view of the formal sunken garden from the loggia of the house. The fine boxwood was planted by Mr. and Mrs. Webb almost fifty years ago.

Lower right. On the far side of the lawn an alcove, with curved stone benches beneath inviting trees and shrubs, looks down upon the sizeable vegetable garden.

NEWS, NOTES and COMMENTS

The Annual Meeting. President Charles B. Harding conducted the annual meeting of the Corporation, held on May 3, 1965. Mrs. James Cox Brady and Leonard J. Buck were elected honorary members of the Board of Managers; and Dr. Lyndon O. Brown, Mrs. Charles Burlingham, Frederick S. Moseley, Jr., Mrs. Hermann G. Place, Michael Rapuana, Mrs. John L. Senior, Chauncey Stillman, and Oakleigh L. Thorne were re-elected members of the Board to serve until 1968.

Distinguished Service Awards were presented to Dr. Julian A. Steyermark, Mrs. John E. Lockwood, and Mrs. Arthur Hays Sulzberger. Excerpts of the citations accompanying the awards follow:

"Dr. Steyermark demonstrated very early an interest in floristics, when he began a survey of the plants of Missouri which has continued for thirty-four years and has resulted in many botanical contributions, culminating in the publication of his monumental *Flora of Missouri* in 1963.

"Dr. Steyermark . [was] an assistant at the Missouri Botanical Garden, then Curator at the Chicago Natural History Museum from 1937 to 1958. In 1959 he became Botanist and Research Taxonomist at the Instituto Botánico, of the Ministerio de Agricultura y Cria, in Caracas, the post which he now holds. In addition he has been Visiting Professor at Southern Illinois University and at the University of Missouri; and during the years 1961, 1962-1963, and 1964-1965, Visiting Curator at The New York Botanical Garden.

"Honors have come to Dr. Steyermark. He was awarded the Order of Quetzal by the Guatemalan Government for his contribution to the Flora of Guatemala, the first American to receive this outstanding recognition. He was a first recipient of the Washington University Plaque, and more recently was made Miembro Honorario de la Sociedad Venezolana de Ciencias Naturales.

"Dr. Steyermark has published some three hundred research papers, including *The Flora of Guatemala* with Dr. Paul C. Standley, and *Contributions to the Flora of Venezuela*. Recently he began the publication of a series of papers on the *Rubiaceae* of the Guayana Highland, as collaborator in the Garden's continuing investigation of the Flora of the Guayana Highland of South America.

"Dr. Steyermark has achieved fame among botanists as a field explorer conducting exploration in Panama, Guatemala, Ecuador, and Venezuela. He has collected more than one hundred thousand specimens, certainly a record among living botanists. He has discovered many genera and species new to science, and second to none has contributed to our inventory of the Flora of the Neotropics.'

". . . One who has given outstanding service to The New York Botanical Garden is Mrs. John E. Lockwood. Of a distinguished heritage, she is daughter of Ellery Sedgwick, famous editor of *The Atlantic Monthly*, and of an equally famous mother, Mabel Cabot Sedgwick, who wrote and in 1906 published that great garden classic, *The Garden Month by Month*. Thus Mrs. Lockwood acquired at her mother's knee, one might say, a thorough knowledge of horticulture. This early interest, which led her to share her enthusiasm with others, has been demonstrated by her willingness to serve not only on the Board of Managers of The New York Botanical Garden but also on the Boards of the International Flower Show, the Horticultural Society of New York, as Chairman of Members at Large of the Garden Club of America and as a member of its Horticultural Committee.

"Her contributions to the welfare of the Garden have been varied and substantial. We often benefit from her original ideas, freely given. She serves as a member of the Corporation and as a member of the Advisory Volunteers. . . .

"She was one of the original three or four dedicated ladies who dreamed, planned, and then developed the Native Plant Garden at The New York Botanical Garden, and she now serves as a Vice Chairman of that committee.

"Mrs. Lockwood serves also as a member of the Park Association and as a member of the International Council of the Museum of Modern Art which sponsors its circulating exhibits.'

"Two of the many interests of Iphigene Ochs Sulzberger particularly identify with major objectives of The New York Botanical Garden—the promotion of horticulture and education. Through The New York Botanical Garden Mrs. Sulzberger has contributed greatly to the public weal by making it possible for young Americans, who otherwise would not have that opportunity, to be trained in the craft, the art, and the science of the practical gardener.

"Hers was the inspiration that sparked the beginning of the Municipal Cooperative Education Program at The New York Botanical Garden, hers the dedication that fanned that first small flame to its present heart-warming proportions. This program is a joint venture of the City of New York, the Board of Education of the City of New York, Christopher Columbus High School, The New York Botanical Garden, and a group of public-spirited citizens who recognized the tremendous import of this new project.

"Graciousness, quiet efficiency, indefatigability of purpose, and modesty have characterized her guidance of the efforts of the cooperating agencies and assured their success.

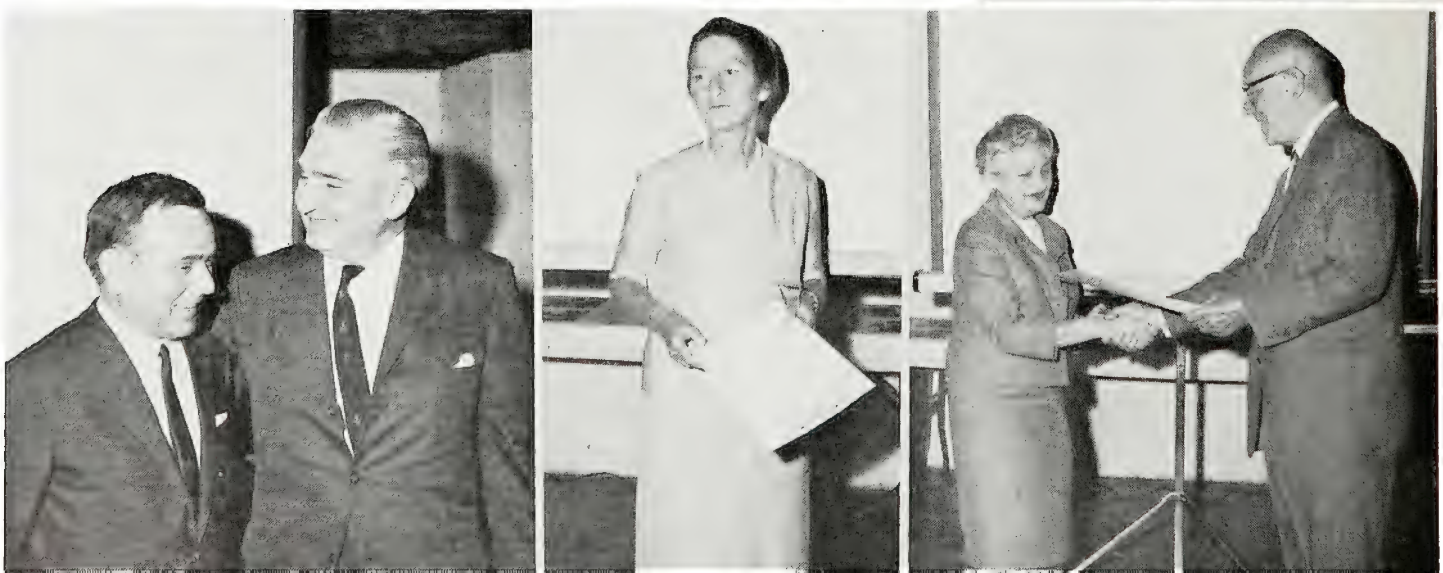
"Mrs. Sulzberger has served as a member of the Board of Managers of The New York Botanical Garden since 1961.

"Her devotion and tireless efforts to the cause of the betterment of the parks of the City of New York are well known and widely appreciated. She is a keen amateur gardener."

Mr. Harding and Dr. William C. Steere spoke briefly, giving interim reports since the fiscal year has been changed to July 1. Then Dr. Hans-Christian Friedrich, Director of the Munich Botanical Garden, gave an illustrated talk on the Garden and on South African succulents.

Upper right, Dr. Julian A. Steyermark accepts the Distinguished Service Award which Charles B. Harding, President of The New York Botanical Garden, has presented to him. Dr. Bassett Maguire, Head Coordinator and Curator of Tropical Botany, who read the accompanying citation, beams with approval.

Lower right, Mr. Harding presents the Distinguished Service Award to Mrs. Arthur Hays Sulzberger. Center, Mrs. John E. Lockwood expresses appreciation for the Distinguished Service Award. Left, Dr. William C. Steere, the Garden's Director, and Dr. Hans-Christian Friedrich, Director of the Munich Botanical Garden, exchange pleasantries.



The Harriet Barnes Pratt Library takes shape as construction progresses. Here the air conditioning units are being lifted one hundred and ten feet high by a crane, each unit weighing over three thousand pounds. All this accomplished within minutes under modern methods!

Reception for Graduates in the Garden's Courses. T. H. Everett, Assistant Director (Horticulture) and Senior Curator of Education, welcomed the graduates, their families, and friends who gathered in the Auditorium of the Museum Building on the evening of June 15, 1965.

Certificates were presented to those who successfully completed the two-year courses in: Botany—John P. Anderson, Doris Aranow, Marjorie G. Bennett, Carol C. Drought, Dorise M. de Mouchel, Jerome A. Eaton, Celia Polomany, Jane R. Schwartz, and Dorothy O. Steere; Practical Gardening—Vincent Algozino, Jane N. Bancroft, William L. Fudge, John J. Giglio, Mary Harper, Elizabeth J. Howell, Joseph Junkin, Catherine Marsh, Alice F. Muchnic, Harold Murray, Theodora C. Rawle, Elizabeth A. Straus, Nancy Angell Streeter, Shapoor Tafti, and Honoré W. Thorne; Landscape Gardening—Joseph Agostini, Jr., Mary Ann Castellana, Kalmia Devero, Rose Dorwitt, Lee Erde, Bernard Glinski, Bess Hamers, Lillian Johnston, Prudence Palmer, Martha V. Palmgren, and Philip H. Smith. Oakleigh L. Thorne, member of the Board of Managers, made the presentation.

Frances M. Miner, Curator of Instruction and Deputy Director of the Brooklyn Botanic Garden, delivered the principal address, "The End or The Beginning."

Activities of the Staff and Director. During the past several months, Dr. William C. Steere, Director, appeared on the NBC radio program, "Speak up with Edith Walton"; served on an ad hoc committee to appraise the present curriculum of the Department of Biology at Swarthmore College and to plan the future of the program; and attended a meeting of the Advisory Council of the Department of Biology at Princeton University, the annual meeting of the Conference of Biological Editors in Philadelphia, a meeting of the Planning Committee of the XVII International Horticultural Congress in Washington, D. C., the sixtieth annual meeting of the American Association of Museums in Philadelphia, a meeting of the U. S. National Committee of the International Union of Biological Sciences in Washington, D. C., and the annual meeting of the Committee of Nominations and Elections of the American Association for the Advancement of Science in Washington, D. C.

Dr. Pierre Dansereau, Assistant Director (Botany) participated in the symposium on "The Future Environments of North America," sponsored by the Conservation Foundation and held at Airlee, Virginia, in April, 1965.

Thomas H. Everett, Assistant Director (Horticulture) and Senior Curator of Education, has been awarded a special medal by the Federated Garden Clubs of New York State, Inc.

Dr. P. P. Pirone, Senior Plant Pathologist, conducted a seminar on "Tree Problems in a Large City" for the Botany and Plant Pathology Department of Louisiana State University, Baton Rouge, in March, 1965, and addressed the New York Section of the Micro-Chemical Society at its annual meeting held at Fordham University on May 20, 1965. His subject, "Plant Pathological Problems in New York City."

Dr. Harold W. Rickett, Senior Curator of Botany, spoke on "Wild Flowers You Have Never Seen" at the annual dinner of the Washington Botanical Society and at the Riverdale Garden Club. In mid-May, he was guest of Dr. and Mrs. Carl Luer at their home in Sarasota, Florida. On a recent visit to the Garden, Dr. and Mrs. Luer had shown him some of their kodachromes — Dr. Luer's hobby is photographing and growing native orchids. Dr. Rickett spent a day of his stay in Sarasota making selections from Dr. Luer's collection of about three thousand slides of Florida orchids for the second volume of the Wild Flower Series. Another day was spent in the Fakahatchie Swamp, seeing and photographing epiphytic orchids, some of which are very rare. (They got lost and had a thoroughly enjoyable time bush-whacking in the trackless wilderness.)

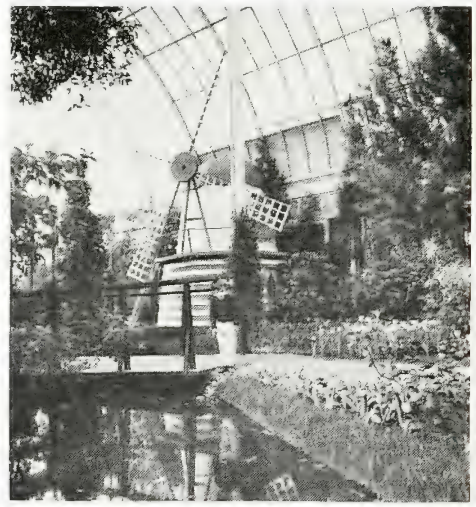
Dr. David J. Rogers, Curator of Quantitative Taxonomy and Dr. Robert Jancey, a member of the Department, will present papers at the meetings of the American Institute of Biological Sciences to be held at the University of Illinois in August, 1965. The papers will deal with procedures and methodology for mathematical studies of systematic botany, as well as the application of computers to botanical problems. Dr. Jancey collected *Manihot* materials in Mexico during June.

Dr. Tetsuo Koyama, Associate Curator, spoke at the Smithsonian Institution Seminar in the new herbarium wing of the Institution, Washington, D. C., on May 10, 1965. His subject, "Temperate Vegetation in the Far East; its outlines and problems in historical plant geography."

Dr. Herman F. Becker, Visiting Research Associate, visited the University of Michigan, Ann Arbor, in April to discuss plant fossils and a forthcoming publication with several paleobotanists. He gave a lecture and demonstrations on paleobotany to a group of students from Harpur College, Binghamton, New York, on their recent visit to The New York Botanical Garden and a lecture, "Fossils are Fun," in the Saturday Afternoon Program series at the Garden on May 8, 1965.

Dr. Marjorie Anchel, Senior Research Associate, attended the meetings of the Federation of American Societies for Experimental Biology, held at Atlantic City, in April, 1965.

Walter Singer, Staff Photographer, gave illustrated talks on "Plant Photography" and "The Four Seasons at The New York Botanical Garden," during the International Photography Ex-



The Dutch windmill with its moving vanes, the fields of tulips criss-crossed by a stream, the masses of other gay bulbs, and the huge cross of fragrant lilies delighted the thousands who visited the Easter Show in the Conservatory.

hibition at the New York Coliseum, May 1-9, 1965. Photographs of trees taken by Mr. Singer were on display in the Museum and Administration Building, to mark Arbor Day, April 30, and City Parks Week.

Dorothy Ebel Hansell, Editor of *The Garden Journal*, was a member of the committee appointed by Dr. Courtney Smith, President of Swarthmore College, to select the recipient of the Arthur Hoyt Scott Garden and Horticulture Award. The committee conferred this honor upon Richard B. Farnham, Executive Secretary of The Horticultural Society of New York.

Mrs. Hansell and Phil Clark, Assistant to the Director (Public Relations), attended a preview of the special exhibit of Venezuelan orchids in the Venezuelan Pavilion at the World's Fair on June 1, 1965, as guests of Manuel Silveira, Commissioner General.

Visitors to the Garden.

Dr. and Mrs. G. C. Dunsterville, Caracas, Venezuela.

Dr. and Mrs. Rolla M. Tryon and Duncan Porter, Gray Herbarium, Harvard University, Cambridge, Mass.

Dr. Maria Teresa Murillo, Herbaria Nacional, Bogota, Colombia.

Dr. Lawrence J. Eilers, State University College of Forestry, Syracuse, N. Y.

Dr. Bernardo Rosenzweig, Facultad de Agronomica, Montevideo, Uruguay.

Dr. Dan H. Nicolson, Department of Botany, Smithsonian Institution, Washington, D. C.

Dr. Hiroshi Koyana, Department of Biology, Faculty of Science, Kyushu University, Japan.

Dr. David Lellinger and Dr. Lyman B. Smith, Smithsonian Institution, Washington, D. C.

Gayle C. Jones, Department of Botany, University of Tennessee, Knoxville.

Keith C. Smith, Kensington, Md.

Dr. Hans-Christian Friedrich, Botanical Garden, Munich, Germany.

Dr. Walter P. Gould, Forestry Department, University of Rhode Island, Providence.

Dr. Anna Medwecka Kornais, Krakow Botanical University, Poland.

Dr. Blake, Queensland Herbarium, Botanical Garden, Brisbane, Australia.

Dr. David D. Keck, National Science Foundation, Washington, D. C.

Mr. and Mrs. B. P. Bole, Jr., Holden Arboretum, Mentor, Ohio.

Dr. Alfred Stanley, National Cancer Institute, National Institutes of Health, Washington, D.C.

Arnold S. Lee, Fort Lee, New Jersey.

H. Spencer, Boston, Mass.

G. Gilbert, Jamaica High School, Jamaica, N. Y.

Twenty-four students from the botany class at Hunter College visited the Research Laboratory in April.

Plant Explorers Searching Himalayas for Ornamentals. Dr. Francis de Vos, Assistant Director of the United States National Arboretum, and Dr. Edward G. Corbett, Horticulturist at the United States Plant Introduction Station, Glenn Dale, Maryland, have been on a three-month trip in the Himalayas to seek out plants which can be introduced as ornamentals into this country. Accompanied by a scientist of the Indian Agricultural Research Institute, they have collected in eastern Nepal, West Bengal, and Sikkim.

The Garden Club of America visited the Garden in May at the invitation of the Native Plant Garden Committee. Louis P. Politi, Horticulturist, shows some of the visitors the pool under construction in the Native Plant Garden, while Dr. William C. Steere, Director, walks through the Thompson Memorial Rock Garden with other members of the Garden Club of America.

This is the ninth ornamental plant exploration sponsored cooperatively by the USDA's Agricultural Research Service and Longwood Foundations, Inc. of Kennett Square, Penn.

Poinsettia 'Pink Spring', developed by plant breeders of the Agricultural Research Service, United States Department of Agriculture, at Beltsville, Maryland, will be on the market late this fall.

'Spring Pink' has bracts of uniform light pink and notched foliage of medium green. The bracts do not fade at the edge, holding their color throughout the plant's showy period. This period lasts two weeks or more, although not as long as that of the best red or white varieties. The plant grows vigorously and its stems are stiff and strong.

A pink-bracted poinsettia grown from seed imported from Mexico was the genetic source of the new poinsettia's color. Plant breeders made a series of crosses, starting with the original pink-bracted plant in 1958.

New Method of Feeding Plants has been announced by the Wisconsin Alumni Research Foundation. The principal advantages of the new method are that it will not burn or otherwise injure the tender roots of young plants. The nutrients are released gradually at a rate in line with the actual needs of the plant, and a single application is designed to last three to five years.

Osborne J. Attoe, Professor of Soils at the University of Wisconsin, describes his invention as "deceptively simple." It consists of a small plastic packet containing selected plant nutrients. The packet resists deterioration in the soil and is processed so that the water-soluble fertilizers sealed within it are slowly released into the soil through microscopic openings in the wall of the packet. The most effective number, size, and position of these extremely small openings, as well as the precise nutrient formulation, have been painstakingly determined through scientific experimentation. Prof. Attoe recommends that the packets, containing two ounces of selected plant food, be placed intact in the soil next to the roots of the plant or tree at a depth of six to eight inches. In pots, the packets are inserted next to the root system in the soil.

Waste of plant food in outdoor plantings is reduced to a minimum, according to Professor Attoe, because the nutrients are released slowly

into the root area where they can be utilized before leaching out. It has also been found that the packets release more nutrients out of doors during warm weather when the plants need it most, and little or none during the winter when none is needed.

Newly planted trees and shrubs need only one or two two-ounce packets for the initial three-year period. For established trees, packets should be placed six to eight inches deep, encircling the tree midway between the trunk and dripline. From five to eight packets are required for established trees, depending on the tree size. For established shrubs two or three packets should be placed separately at a depth of six inches and about one and a half to two feet from the stem.

Potted house plants, which are frequently killed by root-burning from excessive fertilizing, can be fed safely for several years with a single packet. House plants fed in this manner take their nutrients as needed, while the packet acts as a reservoir slowly releasing the necessary nitrogen, phosphate, and potash in correctly controlled proportions.

This revolutionary method of plant feeding, which has been tested for several years at the University of Wisconsin and also at Michigan State University, has been granted a patent by the United States Patent Office. The product is now being manufactured and sold under license from the Wisconsin Alumni Research Foundation of Madison, Wisconsin.

The Connecticut Agricultural Experiment Station has become a National Historic Landmark. The ceremony was held on June 17, 1965, with Benjamin H. Davis, representing the National Park Service. Mr. Davis, Superintendent of the Home of Franklin D. Roosevelt and Vanderbilt Mansion National Historic Sites in Hyde Park, New York, presented the Historic Landmark plaque.

Childs Frick, who died on May 9, 1965, had been a member of the Corporation of The New York Botanical Garden since 1923 and through these years was a generous contributor to the Garden.

Dr. Donald Wyman, Horticulturist of the Arnold Arboretum, Jamaica Plains, Massachusetts, received the Gold Medal of Honor of the Garden Club of America for service in horticulture; Edwin Way Teale of Hampton, Connecticut, the Sarah Chapman Francis Medal for literary achievement; and United States Secretary of the Interior Stewart Lee Udall, the Frances K. Hutchinson Medal for service in conservation. The awards were announced at the fifty-second annual meeting of the Garden Club of America, held in Cleveland during May, 1965. The Founders' Fund Award was presented to the Garden Club of Somerville, New Jersey, to be used for a wildlife observation center in New Jersey's Great Swamp. The latter was dedicated as a National Wildlife Refuge in 1964.

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BOOK REVIEWS

ADVENTURE IN MY GARDEN. Fox, Helen M. 167 pages, illustrated (part color), indexed. Crown Publishers, Inc. 1965. $4.95.

The thrill of seeing great gardens, created by the vision and horticultural skill of a beautiful woman perennially young and with the enthusiasm engendered by living in harmony with the earth, can be captured by anyone who reads Mrs. Fox's latest book *Adventure in My Garden*. The grandeur of Foxden II, her former estate where she planted many trees and shrubs of which she could say simply, "I grew these from seed," as she escorted you along an allee of flowering pink and white dogwood, is preserved in black and white and color photographs. There are charming scenes at her present home, "High and Low," which was the subject of her book *The Years in My Herb Garden*.

The narrative of *Adventure in My Garden* is rich in verbal pictures of the choicest of plants which Mrs. Fox has collected through more than fifty years of gardening. Progressing through the seasons, she introduces species rare in cultivation along with familiar varieties which have fitted into her landscape plans. Each one is noted for its special attribute, some for their disappointing performance, to give the reader a guide in developing a successful planting plan. Mrs. Fox's book can be read almost without stopping for the pleasure of accompanying her about "High and Low" at the height of blooming or fall color in the shrubberies, herb garden, or along the woodland path leading to the small lake she has created on the property. It is also a catalogue of delightful and choice plants to turn to again and again for ideas and inspiration.

A woman of great charm, exquisite taste, artistic and knowledgeable in everything she undertakes, Mrs. Fox is also very hard working and feels a responsibility to share what she has most enjoyed in life. *Adventure in My Garden* is written with clarity and simplicity, and in typical generosity of spirit it is dedicated to her gardeners.

GERTRUDE B. FOSTER, Editor
The Herb Grower Magazine
Falls Village, Conn.

HERB COTTAGE COOK BOOK. National Cathedral Association and All Hallows Guild. 112 pages, illustrated, indexed. Washington Cathedral Herb Shop, Mt. St. Alban, Washington, D. C. 20016. $2.65.

This is a book out of the ordinary, unusual in many ways, and likely to become a collector's item. It not only contains recipes from members of the National Cathedral Association and All Hallows Guild, but it is international in its scope. Forty-four embassies and legations have contributed recipes of their native dishes, most of which contain herbs.

Each chapter opens with a prayer for "Grace" and throughout the entire book are beautiful illustrations of sections of the Cathedral. The headings of each Chapter give a glimpse of what is to follow—a "Cocktail Party," "A Buffet for 24," "A Christmas Dinner," "A Midsummer Cookout," "Come for Dessert and Coffee," and even a "Children's Party." The attractive cover of herb drawings and a well-planned format make this book a fine and interesting gift.

The National Cathedral Association is a fel-

lowship of over ten thousand men and women from the United States and other countries. The book commemorates the twenty-fifth anniversary of the founding of All Hallows Guild.

NANNETTE M. STRAYER
Arlington, Va.

STRAWBERRY DISEASES. Plakidas, A. G. 195 pages, illustrated, indexed. Louisiana State University Press, Baton Rouge, Louisiana. 1964. $5.00.

In the preparation of this monograph Dr. Plakidas drew on his twenty years of experience with strawberry diseases and the information in 766 references. The first three chapters cover the fungus diseases of foliage, roots and crowns, and fruit. Of particular interest is his complete evaluation of the black root rot complex. The next three chapters cover diseases caused by bacteria, nematodes, and viruses and the final chapter is an evaluation of noninfectious variegation or June yellows. Dr. Plakidas was one of the first researchers to study strawberry viruses and his review of the complicated and often confusing virus diseases reflects his intimate knowledge of the subject. The well-chosen illustrations add greatly to the value and usefulness of the monograph, even though many are somewhat dark and lacking in detail.

Dr. Plakidas has met a long-felt need, and everyone with a serious interest in the strawberry should own this fine and relatively inexpensive monograph.

EUGENE H. VARNEY
Professor of Plant Pathology
Rutgers The State University
New Brunswick, N. J.

BENEFICIAL INSECTS. Swan, Lester A. 429 pages, illustrated, indexed. Harper and Row, New York. 1965. $7.95.

Paleontologists tell us that insects, both great and small, thronged this earth for some two million years before the advent of mammals, including man. We also learn that a large portion of the primitive insects were eaters of vegetation. With consideration for the insect's marvelous ability to multiply, it seems a wonder that this planet, like the moon, is not now a plantless and treeless sphere.

But Nature had other plans for this old world. She set one class of insects against another, so that no race could long dominate the scene. So thoroughly was her plan carried out, we are told, that for every group of insects in the world today, there is another group looking over its shoulder, so to speak, ready and willing to wade in with lethal stings, ovipositors, or grinding jaws. In fact, insects seem to be their own worst enemies.

Even these "balancer insects" are themselves held in check by other insects equally equipped. And Lester A. Swan, in his fine book, *Beneficial Insects,* tells the story neatly, factually, and well.

Since Mr. Swan's book followed Rachel Carson's *Silent Spring* by some months, we might be inclined to believe that Mr. Swan received the inspiration for his book from the last work of his gifted and observant fellow biologist. But the truth is quite the contrary. Indeed, according to the records, *Beneficial Insects* was being written long before *Silent Spring* was published. Nevertheless, were Miss Carson alive today, she would commend, no doubt, most highly Mr. Swan's presentation of Nature's alternative to chemical insecticides.

But author Swan does not confine his volume entirely to beneficial insects. He gives credit to the great work of control by birds, mammals, fungi spores, and diseases.

However, he warns the reader against condemning all forms of chemical pesticides. He writes that biological control is mainly for the strategic long haul, and that there may be occasions in the present state of agricultural economy when the careful and limited use of thoroughly tested pesticide chemicals may well be necessary.

RALPH J. DONAHUE
Shawnee Mission, Kansas

SOIL MICROMORPHOLOGY. Jongerius, A. 540 pages, illustrated (part color), indexed. Elsevier Publishing Co., New York. 1964. $22.00.

To the semiprofessional or layman, the title of the book *Soil Micromorphology* may be a little startling. Morphology comes from the Greek *morph* (form) and *logus* (discourse), so the term soil morphology is a discourse on the soil characteristics such as color, texture, shape of particles, structural aggregates, fabrics, and related parameters. The science is generally restricted to what one can usually interpret from his perceptives. Some thirty to forty years ago, Professor W. L. Kubiena introduced microscopic examination to the general field of soil morphology; hence, the term *soil micromorphology* evolved. There is no question that this is an extremely important subject but, at the same time, it is one to which most soils investigators pay little attention except in a general sense. Probably there are only a few hundred individuals in the United States who claim much proficiency in the area of soil micromorphology, but general interest has increased notably within the past decade.

The importance of soil micromorphology to soil science can still be considered somewhat controversial, with Zakharov (U.S.S.R.) some years ago referring to it as a "children's disease," but there probably are few who would subscribe to this extreme view. Most investigators regard the subject as an important part of soil science, as anatomy is to medicine or as architecture is to construction.

The volume is a collection of forty-six professional papers from the Second International Working-Meeting on Soil Micromorphology held in The Netherlands, in September, 1964. The volume covers four major topics: 1) organic matter and humus; 2) soil formation and classification; 3) paleopedology; and 4) methods and application. Of the forty-six contributions, twenty-five are in English, twenty in German, and one in French; the contributions in German and French have English summaries. Authors are from Australia, Belgium, Canada, France, Germany, Hungary, The Netherlands, New Zealand, Poland, Spain, Switzerland, U.S.S.R., and Yugoslavia. American authors are conspicuous by their absence.

Among the contributions from such a diverse international group, there are usually some papers which can be considered outstanding, some of good quality, and others little more than trash. In this volume the whole gamut of professional quality is represented. One-third to one-half of the volume could have been deleted without sacrificing quality.

Kubiena's introductory paper on the role of micromorphology is well written and puts the subject into excellent perspective. Brewer's work on soil fabrics is also outstanding. There are a number of good papers on fabrics and decomposition of organic matter. Micromorphology of soils in selected areas constitutes a large part of the volume. Numerous micrographs, some of which are in color, add to the value of the volume.

This volume is not the final answer to the many questions in understanding the soil system, but it is a good beginning in stating the problems and opening the door to a long-neglected field.

To the indifferent researcher or the layman the volume will be another dust-catcher; but to one really prepared to work on the subject of micromorphology, the volume will be of help in placing soils into proper perspective.

J. C. F. TEDROW
Professor of Soils
Rutgers The State University

HUNTIA. A YEARBOOK OF BOTANICAL AND HORTICULTURAL BIBLIOGRAPHY. Lawrence, George M. Volume 1, vi + 221 pages, Indexed. The Hunt Botanical Library, Pittsburgh, Pa. 1964. $7.50 per volume.

This new addition to the periodical literature of botany and horticulture is best reviewed by quoting its own succinct statement of purpose (p. iv): "*Huntia* is a yearbook devoted to studies of the literature on systematic botany and horticulture, botanical voyages and explorations, early agriculture, medical botany, and the related subjects of botanical biography, iconography, and bibliography. While *Huntia* serves primarily as a record of investigations at The Hunt Botanical Library, its pages are open also to papers from scholars of other institutions." In addition to these worthwhile aims, the editor proposes that *Huntia* also serve in lieu of a published annual report of the activities of The Hunt Botanical Library. The score of papers, notes, and remarks in this first volume are interesting and informative, and will be of value for permanent reference.

WILLIAM C. STEERE

FLUORESCENT LIGHT GARDENING. Cherry, Elaine C. 256 pages, illustrated, indexed. Van Nostrand Co. Inc., New York. 1965. $6.95.

The plant physiologist has, to his discredit, tended to remain aloof from the amateur, neither participating in the excitement of growing plants for pleasure nor contributing to the art and science of gardening. In defense of my profession, I should note that many horticultural and gardening practitioners are basically anti-science and anti-intellectual or, and this is even sadder, they are convinced that they cannot understand the professional scientist. I contend, however, that a good, working knowledge of science is not difficult to acquire, may actually be enjoyable, and will contribute directly to horticulture.

This personal digression is intended to introduce a fine book by Mrs. Cherry on growing plants under light. Hers is not the first book on this subject nor will it be the last. It does, however, set a standard by which others can be judged—as judged they must be. I have read

most of the previous volumes on artificial light and have been dismayed to realize that the hard work of many scientists has simply not been seen or heeded by the popular writer. Not only has the professional studied and reported on many of the "mysteries" which confound the gardener, but the plant physiological literature gives precise answers and techniques which could aid the gardener towards growing better plants. Mrs. Cherry is one of the very few popular writers who has taken the small amount of trouble to gather together some of this information and to present it intelligently to an audience which can profit from it.

Before I go overboard, my pedantic instincts force me to note that there is still a great deal of information which could properly have been included. Thus, she correctly notes that plants grown under certain combinations of fluorescent lamp tend to be smaller, but her explanation of this phenomenon is not correct. Other examples are to be found throughout the book. These semi-errors do not detract from the utility of the volume, but they do cause the curious amateur plantsman to miss an intellectual excitement which can accompany the esthetic pleasures of growing plants.

There are many positive features of *Fluorescent Light Gardening* which require commendation. The sections on the engineering problems —light banks, installation of lamps, types of lamp fixtures, light energy, etc., are accurate, precise, usable, and very well written. I am not as positive as she is that the Sylvania 'Gro-Lux' lamp is the be-all and end-all of fluorescent lights, but her basic fairness in discussing other lamps is notable. The chapters on nutrition, water relations, propagation, and other parts of the art of light gardening are well written and completely clear. The beginner can readily understand and carry out the manipulations necessary to get plants started and to maintain them.

The final section on plants for indoor gardens is well done. It suffers, as do most such books, by a total absence of line drawings showing just what the plants look like. Most beginners know a geranium when they see one; how many know what *Pleispilos bolusii* looks like? (P. S. My wife grew them for a time—I don't like them.)

To sum up: *Fluorescent Light Gardening* is a fine book for the person who wants to start indoor gardening or the moderately advanced gardener who is having trouble. It is written in an interesting, personal style which gets cloying only when plants are personalized (leggy, feet wet, thirsty, etc.). I recommend it heartily.

RICHARD M. KLEIN

THE CONCISE ENCYCLOPEDIA OF FAVORITE WILD FLOWERS. Dietz, Marjorie J. 308 pages, illustrated, indexed. Doubleday & Company, New York. 1965. $4.95.

This is an attractive and useful little book. It consists of formalized description ("type, family, genus, species, uses, habit of growth, flowers, foliage, . .") of a hundred common wild flowers, each illustrated by a clear and charming drawing. (For a wonder the publisher didn't insist on a "color section"—and then give it a shabby job of reproduction.) Additional species in large genera are briefly mentioned. The species are arranged alphabetically by English names, which introduces some problems: you will look in vain for "Buttercup" or "Crowfoot"—the only one shown is "Swamp Buttercup." The species selected are, of course, Mrs. Dietz' favorites, and, though no geographic range is stated, are all easterners. The emphasis is upon culture rather than identification, upon eastern wild-flower gardens.

Some day, I hope, we shall be able to teach people that the name of a species is at least two words, not one; not, for example, "canadensis"!

H. W. RICKETT

WILD FLOWERS OF WASHINGTON STATE. Robinson, Ellis and Gayle. 61 pages + appendix, illustrated, color. Robinson's, Edmonds, Washington, 1964.

It is good not to be walking alone in forgotten ways. The spate of new wild-flower books continues. The latest arrival is this small, paper-covered book of color-photographs by Ellis Robinson. Forty species are shown, many with a verse by Gayle Robinson on the facing page. Botanical names and other information are found in an appendix. The photographs are excellent, generally well posed and exposed; most of the color-reproduction is very bad.

H. W. RICKETT

ORCHIDS OF THE WESTERN GREAT LAKES REGION. Case, Frederick W., Jr. 147 pages, illustrated (part color), indexed. Cranbrook Institute of Science, Bloomfield Hills, Michigan. 1964. $7.00.

As an example of a local treatment of a very complex family, *Orchids of the Western Great Lakes Region* is excellent. In particular, the use of line-drawings illustrating the keys is a very useful device, and should be used by more authors. The illustrations, both drawings and photographs, are quite good, although the color plates have apparently lost a bit in reproduction. Descriptions of species are excellent, and are coupled with extensive habitat data.

The only flaws in the book lie in the sections on orchid morphology and evolution. The nature of the rostellum is not as well known as the author indicates; and many of the remarks on orchid evolution are premature, as very few hard facts exist in this area. However, these minor errors do not prevent the book from serving its primary purpose, that is, as an excellent local guide to orchids.

M. WIRTH

ORCHIDS AND OTHER AIR PLANTS OF THE EVERGLADES NATIONAL PARK. Craighead, Frank C. 127 pages, illustrated (part color), indexed. University of Miami Press, Coral Gables, Florida. 1963.

Dr. Craighead's volume is intended as an aid to the amateur for general identification of most epiphytes in the Everglades Park. The introductory material on the Park is excellent. The keys are well constructed, in that the non-specialist can identify these air plants with reasonable ease and without extensive botanical knowledge. Descriptions are generally accurate, and written for the interested layman. A most praiseworthy feature of the book is the abundance of clear photographs (many in color) and line drawings, illustrating all the species covered.

A few botanical errors are present, unfortunately; most of these, being minor, will not interfere with the non-specialist's use and enjoyment of Dr. Craighead's book.

M. WIRTH

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ALGAL CULTURES AND PHYTOPLANKTON ECOLOGY. Fogg, G. E. 126 pages, illustrated, indexed. University of Wisconsin Press, Madison, Wisc. 1965. $5.50.

This book is based on a series of lectures given by Dr. Fogg while a Visiting Professor in Limnology in the Department of Zoology, University of Wisconsin, in the spring of 1963. The growth of algae in laboratory cultures is considered first, followed by a discussion of the effects of nutrients, oxygen, temperature, and

light on the growth and distribution of the vegetable plankton in lakes and coastal waters of the sea. The style of writing is graceful and easily comprehended. The author makes his point: the aquatic environment, though less complex than the terrestial environment, is still little understood.

ALMA W. BARKSDALE

THE MATTER OF MENDELIAN HEREDITY. Lewis, K. R. and B. John. 269 pages, illustrated, indexed. Little, Brown and Company, Boston, Mass. 1964. $10.00.

It is a delight to read this book. One would not think that an elementary text on genetics could be delightful, but here is the rare exception among many dull texts. It is written, of course, by Englishmen who write in concert so well that one feels the book is by Lewis John, not Lewis and John. They use the English language with simplicity, clarity, and precision, thus providing the reader with both pleasure and understanding.

To quote the authors, "This book is for those who have yet to rediscover the particles and paradoxes of Mendelian heredity and is dedicated to those who benefit by reading it."

ALMA W. BARKSDALE

THERMOPHILIC FUNGI. Cooney, Donald G. and Ralph Emerson. 188 pages, illustrated, indexed. W. H. Freeman and Company, San Francisco, California. 1964. $5.00.

As defined by the authors of this book, thermophilic fungi are those which thrive at the unusually high temperatures of 50°C and higher, but are unable to grow at ordinary temperatures of 20°C. Thermophilic fungi account for the spontaneous combustion of stored hay and grain and are often involved in various composting actions, in waste disposal systems, and in the curing of certain products such as chocolate and tobacco. Some thirteen species of fungi are considered to be thermophilic. These are described in detail. Taxonomic, morphologic, cultural, and ecologic features are stressed. The treatment is excellent and well illustrated including drawings, black-and-white and colored photographs. Four new species and three new varieties are described. Chapters on natural occurrence, importance in humification and composting action, and economic importance in stored agricultural products and in industrial processes are especially informative. While primarily of interest to the mycologist, the book will undoubtedly be useful to those in agriculture, industry, and medicine.

CLARK T. ROGERSON

A MONOGRAPH ON THE GENUS GALERINA EARLE. Smith, Alexander H. & Singer, Rolf. 384 pages, 289 figs, 20 plates. Hafner Publishing Co., N. Y. 1964. $23.50.

Fungus hunters who search swamps and forests which are carpeted with mosses are soon aware of small, pale or tawny-colored mushrooms with typically bell-shaped caps and which produce ochraceous yellow or rusty brown spore prints. Most of these are members of the genus *Galerina* (in many of the mushroom books called *Galera*). While many species are found only in mossy habitats, on sphagnum, on polytrichums, on moss-covered logs, others occur on burned ground, on detritus left by avalanches, on open lawns, on conifer needles, in cellars, in greenhouses, on rich loam, and so on. In general fruit-bodies of the species are too small to be considered as esculents; a few have been listed as edible in some books; no information on edibility is given in this book. Until now it has been virtually impossible to identify a species of *Galerina*.

In this excellently prepared monograph Dr. Smith of the University of Michigan and Dr. Singer of the University of Buenos Aires divide the genus into two subgenera and nine sections. Two hundred and three species are included; forty-eight are described as new. Many varieties (twenty-five new) and forms are recognized. Very few of these can be distinguished without a study of microscopic features; hence microscopic detail is stressed throughout. For each species synonymy, a detailed description, information on habit, habitat, distribution, observations on distinctive features, and material examined are presented. Numerous line drawings illustrate spores and other microscopic structures. Black-and-white photographs of fruit-bodies are provided for about fifty species. Mycologists and mushroom enthusiasts will need this book to identify members of an interesting and challenging group of agarics.

CLARK T. ROGERSON

ENVIRONMENTAL MEASUREMENT AND INTERPRETATION. Platt, Robert E. and John F. Griffiths. 235 pages, tables and graphs. Reinhold Publishing Corporation, New York, and by Chapman & Hall, London. 1964. $8.75.

This addition to Reinhold Books in the Biological Sciences will be welcomed by experimental biologists in general and by ecologists in particular. The book discusses the concept of environment and the factors composing it, following this with a chapter on experimental design and the analysis of data. The remaining seven chapters comprise a critical review of the methods available for the measurement of the environmental factors previously described. There are three appendices, containing tables and graphs of environmental data, an address list of instrument manufacturers, and a list of citations arranged chapter by chapter.

This book should prove invaluable to graduate students and research workers concerned with problems of environmental measurement, both for its information on experimental design and as a source of reference to available measuring techniques.

R. C. JANCEY

GARDEN SHRUBS AND THEIR HISTORIES. Coats, Alice M. 416 pages, illustrated, (part color), indexed, bibliography. E. P. Dutton & Co., New York. 1965. $8.95.

Alice Coats heads the bibliography of this splendid book with a quotation from Samuel Johnson: "A Man will turn over half a library to make one book." Cullings from half a library at least are brought together here, skillfully assembled and accompanied by lore, recollections, and the author's own observations on garden shrubs. More than one hundred and ten genera are treated in essays ranging from several paragraphs to twenty pages in length. These essays present the important facts in the matters of discovery and introduction, taxonomic history, desirable species and hybrids in cultivation now or in the past, and literary associations of the plants discussed. Although the book has not been revised for its American publication (it was published in England in 1964), this raises no particular difficulties as the emphasis is not on cultural information. Handsome plates, reproduced for the most part from source books in botany, horticulture, and the natural sciences, add to the attractiveness of the book; its usefulness is increased by a bibliographical section dealing with figures important in the collection, cultivation, and study of garden shrubs, a conscientious selected bibliography, an index to English and American common names, and a biographical index.

HARVEY SIMMONDS

SCIENTISTS WHO WORK WITH CAMERAS. Poole, Lynn and Gray. 176 pages, illustrated, indexed. Dodd, Mead & Company, New York. 1965. $3.50.

Photography has come a long way from the time when the "camera obscura" was first described by the Italian physicist, Giambattista della Porta, in 1553. Today, photography has taken firm stands in such varied fields as art, journalism, communication, and last but certainly not least, science. There is no part of modern science which does not use photography in one form or another to search for new results or to record the results from the research. Photography can reach places where the human eye is not able to see, may that be in outer space, at the bottom of the ocean, or in the center of masses far beyond the capability and capacity of the human eye. The authors have efficiently brought together the work and achievements of twelve men who work in modern science and who have ingeniously invented cameras and photographic equipment to suit their needs in their specialized fields, such as astronomy, radiology, outer-space and underwater explorations, and cartography. Even though the book may seem rather technical at times, it is most fascinating to look into the field of photography as it is used by scientists. A long way from camera obscura, but always the writing—"graphos" with light—"photon".

WALTER SINGER

BRIEF NOTES ON RECENT BOOKS

BONSAI

BONSAI, A SUNSET BOOK. 80 pages, illustrated, indexed. Lane Book Company, Menlo Park, California. 1965. $1.95.

A new Sunset Book provides information on the culture and care of miniature trees, a plant hobby which is adaptable to apartment living, and also on incorporating a bonsai into the decor of a room.

FLOWERS

FLOWERS OF THE WORLD. Sherman, Robert S. and Charles L. 280 pages, illustrated (color), indexed. Doubleday & Co., New York. 1964. (rec'd March, 1965). $8.95.

This was first published as *Flowers of the World in Full Color* in 1958; translated into French and its format redesigned and printed

by Hachette in Paris in 1963. The present edition follows the French format.

GLOXINIAS AND HOW TO GROW THEM. Schulz, Peggie. 128 pages, illustrated (part color), indexed. M. Barrows & Co., New York. 1965. $4.50.

This is a revised edition of the book published in 1953. Information on culture and the lists of species and varieties have been updated, and the chapter on growing gloxinias under fluorescent light has been expanded.

THE ROSE QUESTION AND ANSWER BOOK. Milton, John. 192 pages, illustrated, indexed. Hearthside Press, Inc. New York. 1965. $3.95.

The author, editor of eighteen catalogues on roses, a professional observer of roses under tests, and a home gardener who specializes in growing roses, is qualified to furnish answers on the kinds of roses, their planting and transplanting, their feeding, watering, mulching, season by season care, insect and disease prevention and control.

FLOWER ARRANGEMENT

ABC OF FLOWER ARRANGING. Clements, Julia. 96 pages, illustrated. D. Van Nostrand Company, Inc., Princeton, N. J. 1964 (rec'd March, 1965). $4.95.

Julia Clements, a pioneer in flower arranging, had ten successful books on various aspects of this art to her credit, when she responded to a request for a book which answers "the problems which bother eager flower arrangers in the early stages of mastering this fascinating craft. ."

ARRANGING CHURCH FLOWERS. Purefoy, Molly. 80 pages, illustrated (part color). Hearthside Press, New York. 1965. $5.95.

This book furnishes simple, practical guide lines to appropriate flower arrangements for churches of all denominations and from the simple village church to the imposing cathedral. Practical, yes, but also inspirational, for the author has been arranging flowers in churches of all sizes for most of her life.

BETTER HOMES AND GARDENS FLOWER ARRANGING. 160 pages, illustrated (mostly color), indexed. Meredith Press, Des Moines, Iowa. 1965. $3.95.

A million copies of the first edition of *Better Homes and Gardens Flower Arranging*, which made its appearance eight years ago, was sold—indicative of the widespread interest of the subject. The current edition includes examples of contemporary designs in flower arranging by professionals and amateurs; and the sections on table arrangements for formal or informal occasions and on prize-winning arrangements for flower shows have been expanded.

FLOWER ARRANGEMENTS WITH ANTIQUES. Hemingway, Beth. 191 pages, illustrated, indexed. Hearthside Press, Inc., New York. 1965. $5.95.

The author lives in a restored two-hundred-year-old farm in Virginia, which has a new wing for her flower-arrangement studio and antiques, so she is qualified "to give both the flower arranger and the collector a simple and lucid account of the ways in which one art can enrich the other." The book is well illustrated with arrangements typical of periods in actual settings in famous homes and historic shrines.

There are notes on preserving plant material and on antiquing, and a section on home remedies for removing rust, patching leaking containers, applying metallic finishes, mending broken articles, etc.

FLOWER DECORATION FOR THE TABLE. Stevenson, Violet. 71 pages, illustrated, (color). The Viking Press, New York, N. Y. 1965. $3.98.

This internationally known expert in arranging flowers demonstrates how they can be effectively used to enhance an everyday meal or an important occasion in the home. Appropriate china, glass, silverware, linen, and table accessories are also indicated.

FOLIAGE ARRANGEMENTS, THE NEW BOOK OF. Cyphers, Emma Hodkinson. 152 pages, illustrated, indexed. Hearthside Press, New York. 1965. $4.95.

This book was originally published as *Foliage Arrangements* in 1957. It has been revised and enlarged by the addition of text on modern designs and thirty new photographs.

JAPANESE FLOWER ARRANGEMENT, THE EASY MAGIC OF. Quinn, Lee Early. 180 pages, illustrated (part color), indexed. Charles E. Tuttle Co., Rutland, Vt. 1965. $7.50.

The author, a graduate of the Ichujo School of Floral Art in Tokyo, and a student of the Sogetsu and Ikenebo, is a writer, lecturer, and demonstrator on Japanese flower arrangement. In this book she gives ten basic Ikebana patterns and their variations for the beginner "who wants to know how to do simple but effective arrangements for home, club, or community. . ."

SPACE AND COLOR IN JAPANESE FLOWER ARRANGEMENT. Teshigawara Kasumi, 128 pages, illustrated mostly in color, glossary. Japan Publications Trading Co., Rutland, Vt. 1965. $6.95.

The author, daughter of Sofu Teshigawara who is founder and head of the Sogetsu School of Ikebana, has prepared this practical guide for the beginner in the Japanese art of flower arrangement; but one who has mastered the techniques will be inspired for further accomplishment by the forty-eight artistic compositions, all illustrated in color.

She accompanied her father to this country in 1962 to conduct demonstrations and the following year to assist him in a private exhibit at Lincoln Center.

GARDENING

THE ROCKWELL'S COMPLETE GUIDE TO SUCCESSFUL GARDENING. Rockwell, F. F., and Esther C. Grayson. 518 pages, illustrated, indexed. Doubleday & Co., New York. 1965. $6.50.

Two of America's widely known horticultural authors have written a book for the busy home owner with limited experience in gardening. They tell him what to do, when and how, and also what not to do, and include anecdotes of their own personal experiences which make the book delightful as well as informative.

There's a garden calendar for different sections of the country according to six climatic zones; notes on special garden problems, and the appendix lists plants for special uses in different areas; all-purpose sprays and schedules, and pesticides, fungicides and herbicides.

LAWNS AND GROUND COVERS, A SUNSET BOOK. 112 pages, illustrated, indexed, summary. Lane Book Company, Menlo Park, California. 1964. $1.95.

This favorite Sunset Book has been revised to furnish the latest information on the planting and care of lawns and ground covers, with a section devoted to new varieties of ground covers.

GARDEN COLOR, A SUNSET BOOK. 80 pages, illustrated (part color), indexed. Lane Book Co., Menlo Park, California. 1965. $1.95.

Gathering of new materials and research have resulted in a completely revised edition of *Garden Color*, originally published in 1958.

LANDSCAPING

LANDSCAPE ARCHITECTURE. Cleveland, H. W. S. (Roy Ludove, ed.). XXI + 59 pages. University of Pittsburgh Press, Pittsburgh. 1965. $2.95.

This is a reprint of the original edition of 1873, long out of print, with only minor alterations in spelling and punctuation and the omission of a supplementary "Essay of Forest Planting on the Great Plains."

Mr. Lubove has written an interesting Introduction on "Mr. Cleveland and the urban-rural continuum in American landscape architecture."

LANDSCAPING AND OUTDOOR LIVING, LADIES HOME JOURNAL BOOK OF. Pratt, Richard. M. Evans & Co., New York, N. Y. 1964. $7.95.

Under the auspices of the *Ladies Home Journal*, on whose editorial staff he has been for the past thirty years, Richard Pratt set up on his own place in Bucks County, Pennsylvania, a workshop where landscaping and architectural ideas for outdoor living could be developed and followed through from start to finish. Most of the ideas presented in this book and many of the photographs were taken there.

LANDSCAPE GARDENING IN JAPAN. Conder, Josiah. 251 pages, illustrated, indexed. Dover Publications, Inc., New York. 1964. $2.75.

This is an unabridged and corrected republication of the second revised edition (1912) of *Landscape Gardening in Japan* and *The Supplement to Landscape Gardening in Japan*, both originally published in 1893, with the supplement of forty plates and a new preface prepared by Clay Lancaster.

Conder went to Japan in 1877 at the invitation of the Japanese government to become the first instructor of architecture in the Engineering Department of the Imperial University. He is credited with having introduced Occidental styles into Japan and he in turn became imbued with Japanese forms of art. His book details Japanese landscape gardening techniques, and aesthetic and philosophical concepts.

MISCELLANY

AMERICAN CAMELLIA SOCIETY YEARBOOK. Pyron, Joseph H. (ed.) 323 pages, illustrated (part color). American Camellia Society, Tifton, Ga. 1965. Included in Society dues of $6.00.

This attractive 1965 Yearbook is a credit to the American Camellia Society. Its contents are varied and stimulating, covering culture, new varieties, the performance of camellias in dif-

ferent parts of this country and in England, and some research which is being conducted on these plants. It also has interesting accounts of several personalities: George Joseph Kamel, the Sawadas of Mobile, Alabama, the Kemps of Goldboro, North Carolina, and Frederic Heutte of Norfolk, Virginia. Tribute is paid to Mr. Heutte as "Creator of Beauty" of the Botanical Garden and parks in Norfolk, Virginia, which have been developed under his vision and fine direction.

MY FRIEND THE GARDEN. Lequenne, Fernand. 225 pages, Doubleday & Company, Garden City, N. Y. 1965. $4.95.

This book, with a preface by Louise de Vilmorin, the noted French author, and translated by Suzanne Comber Taylor, was originally published in France in 1941 as *Mon Ami Le Jardin* and reprinted seven times.

It is a tender, poetic book in which the author's love and knowledge of plants is charmingly communicated.

MAN IN NATURE. Bates, Marston. 116 pages, illustrated, indexed. Prentice Hall, Inc., Englewood Cliffs, N. J. 1964. Cloth $3.95, paper $1.75.

This second edition of the enthusiastically received *Man in Nature,* published in 1961, introduces new and relevant information.

OUR NATIONAL PARKS IN COLOR. Butcher, Devereux. 190 pages, illustrated (color), indexed. Clarkson N. Potter, Inc., New York, N. Y. 1965. $5.95.

Those who are contemplating a visit to our national parks, or nature monuments, or national archaeological monuments will find this well-illustrated, compact book interesting and useful. Those who like to keep informed or to recall past visits will also find the book interesting. Interspersed with concise descriptions of these national preserves, which Mr. Butcher knows and loves, are short topics, such as "Are We Losing Paradise?" "Those Esthetic Values," "The Voice of the People and The National Policy."

SOIL CLAY MINERALOGY. Rich, C. I., and G. W. Kunze (eds.) 330 pages, illustrated, subject index. University of North Carolina Press, Chapel Hill, N. C. 1964. $8.00.

This book presents a condensed version of the lectures given by notable clay mineralogists during a 1962 seminar at Virginia Polytechnic Institute. The seminar was supported by the National Science Foundation, the Southern Regional Education Board cooperating with thirteen land-grant institutions in its sponsorship.

COST CONTROL IN SOUTHERN FORESTRY. McDermid, Robert W. (ed.) 131 pages. Louisiana State University Press, Baton Rouge, La., 1965. $4.00.

The Thirteenth Annual Forestry Symposium was concerned with the "economic reasoning involved in the establishing, managing, and harvesting of timber products. Although the topics are regional in title, their implications should be useful whatever the location."

SOILS, AN INTRODUCTION TO SOILS AND PLANT GROWTH. Donahue, Roy L. 363 pages, illustrated, indexed. Prentice Hall Inc., Englewood Cliffs, N. J. 1965. $10.60.

This is a second edition, the first was published in 1958. Revised and brought up to date, it is a practical approach to the principles of soil science that are universally applicable.

THE SCIENTIFIC PRINCIPLES OF CROP PROTECTION. Martin, Hubert. 376 pages, author and subject index. St. Martin's Press, New York, N. Y. 1965. $15.00.

This fifth edition of a well-known book (first published in 1928) records two important developments: the success of the synthetic chemist in devising molecules of a high selective toxicity, reducing the hazardous defects of pesticides; and the advances in applied biology, leading to knowledge which will result in control by subtler means than the toxic chemical.

SHELL ART. Krauss, Helen K. 128 pages, illustrated (part color), indexed. Hearthside Press, Inc., New York. 1965. $6.95.

In this instructive book for shell collectors is an extensive chapter on making flowers and bouquets with shells. The author's own shell creations are now in many art collections—one of her most valuable mosaics contains more than twelve thousand individual shells, and her mixed floral bouquets are exquisite.

MEET THE SOUTHWEST DESERTS. Welles, Philip. 84 pages, illustrated, indexed. Dale Stuart King, Tucson, Arizona. 1965. Cloth $3.00, paper $1.50.

This is a revised, second edition of the book which was originally published in 1960, covering the life to be found on the desert—plants, mammals, birds, reptiles, insects.

CRAFTS AND TRADES OF JAPAN WITH DOLL-AND-FLOWER ARRANGEMENTS. Chandler, Billie T. 56 pages, illustrated (color). Charles E. Tuttle Company, Rutland, Vt. 1965. $5.00.

In this Tuttle Gift Book, Mrs. Chandler portrays verbally and Shigemasa Nagai pictorially the enchanting miniature arrangements which skillfully combine Japanese floral art with "dolls." Actually, these are not dolls, toys, in the accepted meaning of this word, but crafted figurines.

Mrs. Chandler also presents an interesting account of the crafts and trades of Japan, with which she became acquainted while a teacher in American schools in the Orient.

LETTERS TO THE EDITOR

Thomas MacDougall's article on *Talauma mexicana* in *The Garden Journal*, March-April, 1965, interested me very much. I, too, have attempted to bring material of this species into cultivation, and found it not common in the parts of southern Mexico and Guatemala I visited briefly last summer. But I did locate and photograph one authentic cultivated specimen in flowering condition outside the rain forests. It is alongside the Pan-American Highway, is climbable, and should furnish in season a relatively convenient source of seeds and scions.

This "heart flower" tree stands before the Catholic Church in Ocozocautla, Chiapas. On August 6, 1964, it had its earliest flower buds almost to the stage shown in MacDougall's picture at the top of page 70. Its nearly glabrous leaves were, as shown in his picture, with long petioles. The petioles were marked for nearly their entire length by stipular scars, as is always true in *Talauma*. The several evergreen *Magnolia* species in Mexico, Central America, and Venezuela are like *M. grandiflora* in having stipules free of their petioles. My identification of the tree as *T. mexicana* was later confirmed by a taxonomist at the University of Mexico.

Helen O'Gorman, in her generally excellent *Mexican Flowering Trees and Plants,* writes, "The dark lustrous, leathery leaves are longer, more roundly-elliptical and less shiny than the leaves of the *Magnolia grandiflora* which one sees more often in cultivation in gardens of Mexico and in the south of the United States. Also, the flower is smaller and the petals thick and more leathery." Her facing full-page color drawing, however, is a good representation of a form of *Magnolia grandiflora,* its leaves rusty-tomentose beneath and with no stipular scars on their petioles. The O'Gorman color plate has been copied in black and white in Edwin A. Menninger's *Flowering Trees of the World,* and probably elsewhere, giving credence to the mistaken belief that *T. mexicana and M. grandiflora* are almost indistinguishable. Mrs. O'Gorman's model evidently must have been misidentified. The clear pictures by MacDougall should be a better aid to any who look for the true "heart flower" in its native region.

On our 1964 trip, Mrs. McDaniel and I were able to collect scions at a higher altitude in Chiapas of a recently described *Magnolia* which is probably a rarer and less-known tree than the Mexican *Talauma*. This is the almost entirely glabrous *Magnolia sharpii* Miranda. Scions of it and of the rather similar *M. guatemalensis* Donn. Sm. from near Coban, Guatemala, were air-mailed to Washington, where Sylvester G. March at the United States National Arboretum successfully grafted them on *M. grandiflora* stocks in the greenhouse. We hope to try this understock later with another importation of *T. mexicana,* whose branches Mr. March did not succeed in rooting as cuttings.

In Guatemala, as in Mexico, *M. grandiflora* succeeds at high altitudes and is the commonest and nearly the only evergreen *Magnolia* species in cultivation. Only in and near Coban did we see any planted specimens of *M. guatemalensis,* but *M. grandiflora* was the most frequent even in Coban patios.

Joseph C. McDaniel
Assistant Professor of Horticulture
University of Illinois
Urbana

Dr. Thomas E. Moore, Curator of Insects at the University of Michigan in Ann Arbor, Michigan, has informed me that the cicada, published in "Insects, Flowers, and Evolution" in *The Garden Journal,* May-June, 1965, belongs to the genus *Okanagana.* No close relatives of this genus have ever been reported as fossils. Dr. Moore suggests that *Okanagana beckeri* would be an appropriate name. A description of the holotype is forthcoming. I found the fossil during a recent expedition to the Oligocene Ruby paper shale locality in Montana. It is one and a half inches long and about thirty-five million years old.

Herman F. Becker

THE NEW YORK BOTANICAL GARDEN'S GUATEMALA TOUR

The Garden's Guatemala Tour is symbolized here in flowers —for the tulip tree *(Liriodendron tulipifera)* is the official floral emblem of The New York Botanical Garden, which is sponsoring the October 22-November 6, 1965, tour to the Central American republic of Guatemala, whose national flower is the *monja blanca* or white nun orchid *(Lycaste skinneri alba)*. Price of the all-expense Tour is $1,198.

The Tour will visit private homes and gardens, scenic mountains and tropical forests, volcano-circled lakes, Indian markets and villages, tropical agricultural centers and coffee plantations. Transportation within Guatemala will be in cars driven by English-speaking chauffeur-guides. Travel between New York and Guatemala will be by air. Botanical authorities, headed by NYBG Director William Steere, will accompany the Tour to answer plant questions.

Send your Tour application or request for more information to: The Garden's Guatemala Tour, New York Botanical Garden, Bronx, New York 10458. There is still room for a few more. Response, however, has exceeded expectations.

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CLASSIC TREES FOR URBAN GARDENS AND STREETS

By EDWARD H. SCANLON

Mr. Scanlon has been Editor and Publisher of *Trees Magazine* since its inception twenty-eight years ago. He was also Commissioner of the Cleveland, Ohio, Division of Shade Trees from 1946 to 1954. During that time his program of using form and flowering trees set a pattern which revolutionized thinking in street tree management. Since then he has been growing street and ornamental trees under the trademark of "Tailored(R) Trees" in Olmsted Falls, Ohio.

AFTER VISITING MANY of the famous gardens in Europe and observing many functional street plantings in countries around the world, it is my opinion that Americans have overlooked a golden opportunity to stylize their gardens and streets with trees of classical stature.

No one can be criticized for the mundane landscaping across this country, and criticism is not the purpose of this paper. Instead, it is my wish to inspire plantsmen to be discreet and perspicacious in their choice of trees, and to base their selections on existing site factors.

Classic trees are used throughout Europe and Great Britain, principally on streets where there is limited space for root system, trunk, and crown. Form and compact varieties have been planted not only with a high degree of embellishment, but with a high degree of practicality, maintenance and conflict being reduced to a minimum and in many cases eliminated.

Briefly, the term "classic trees" may be defined as trees which grow into a known form such as round-headed, globe, conical, columnar, or weeping. These cultivated or selected forms cannot be achieved as seedlings but must be propagated vegetatively, if the form of the parent tree is to be assured. Noteworthy among the classic trees being grown and used in the United States, Europe, and Great Britain are the following, which are listed according to form.

CONICAL FORM

Trees of conical form constitute one of the most practical "tools" the municipal arborist can employ. The apex of the crown presents the least bulk to wind, snow, and ice, thus practically immunizing the tree from expensive and deforming damage. The wide part of the crown is low, and where this type of tree is planted on streets, it is protected by adjacent buildings. At the same time, shade is produced close enough to the sidewalk or street to answer such a demand, and the eye sees a nice symmetrical form which fulfills all the purposes of a street tree—shade, beauty, and low maintenance.

In addition to form, a few remarks are noted under each of the better conical cultivars:

'Chanticleer' pear (*Pyrus calleryana* 'Chanticleer') Plant Pat. #2489. Sharply and very uniquely conical for the species. White flowers and good fall color greatly complement this form. Height to thirty-five feet.

'Scanlon' maple (*Acer rubrum* 'Scanlon') Plant Pat. #1722. Superb orange-umber fall color. Height to forty feet.

'Doctor Pirone' ash (*Fraxinus angustifolia* var. 'Doctor Pirone'). Fine-textured, glossy foliage. Slightly pendulous effect. Height to thirty feet.

'Rancho'(R) linden (*Tilia cordata* 'Rancho'(R)) Plant Pat. #2092. Fragrant flower. Very compact crown of small foliage. Radial branching and vigorous growth. Height to thirty feet.

'Gerling' maple (*Acer rubrum* 'Gerling'). Good fall color. Handsome, compact, medium-conical crown. Height to forty feet.

Pyramidal European hornbeam *(Carpinus betulus pyramidalis)*. Winter silhouette of formal, fine-twigged crown is handsome and picturesque. Height to forty feet.

GLOBE FORM

Globe forms have long gone unsung and even abused in our land. Little-informed and unimaginative persons even foolishly call them "freaks." But the globe form is a practical "tool" which a real plantsman uses with splendid results. Its formal effect is greatly admired by most laymen—

Cherry 'Scanlon'
(*Prunus avium* 'Scanlon')
Pat. Pend.

in fact, they love the orderly appearance. The globe is perfect for outdoor living rooms, formal areas, or small gardens; under low overhead wires and with sufficient setback space, it is invaluable:

Globe Norway maple *(Acer platanoides globosum)*. Very compact. Slow, but very reliable.

Globe locust *(Robinia pseudoacacia umbraculifera)*. Fast-growing. Good show tree. Must be sprayed for borers.

Flowering globe locust *(Robinia hispida × macrophylla)*. Beautiful heavy racemes of pink flowers.

'Scanlon' globe cherry (*Prunus avium* 'Scanlon'). White flowers; glossy foliage.

Globe European ash *(Fraxinus excelsior globosa)*. Large globe. Height to twenty-five feet with twenty-foot spread.

'Tailored'(R) Bunge ash (*Fraxinus bungeana* 'Tailored'(R)). Bunge ash is bushlike. The 'Tailored'(R) form is worked on a seven-foot standard. Fragrant flowers.

'Tailored'(R) Sargent crab-apple (*Malus sargentii rosea* 'Tailored'(R)). Sargent is a small, bushlike crab. Worked on a seven-foot standard, it makes a splendid small street or garden subject.

Crab-apple 'Van Eseltine' (*Malus* 'Van Eseltine').

Columnar Form

For accent in or screening the garden or along property lines, any of the listed columnar trees will do a superb job. Don't use Lombardy poplars—they become too large and are disease-prone. On heavily traveled streets with large vehicular traffic, shallow setbacks, and no wires, the columnar form is indispensable:

Dawyck beech (*Fagus sylvatica* 'Dawyck'). The most majestic of uprights. Long-lived. Height to eighty feet.

Wilson columnar mountain-ash *(Sorbus aucuparia wilsoni)*. White flowers; orange fruit. Superb compact columnar form. Height to twenty-five feet.

'Rancho'(R) Sargent cherry (*Prunus sargentii* 'Rancho'(R)). Plant Pat. #2065. Pink flowers; grand fall color. Height to thirty feet.

'Olmsted' maple (*Acer platanoides* 'Olmsted'). This is a true column. The common "upright" is pyramidal.

'Armstrong II' maple (*Acer rubrum* 'Armstrong II'). Good fall color not present in the first cultivar. Narrow column. Height to thirty-five feet.

Columnar hawthorn *(Crataegus monogyna stricta)*. Tight form. White flowers; small, red fruit. Height to twenty-five feet.

'Beauty' crab-apple (*Malus* 'Beauty'). Fragrant, white flowers; attractive "jelly" fruit.

'Van Eseltine' crab-apple (*Malus* 'Van Eseltine'). Grand in flower, the flowers being oyster-gray. Height to sixteen feet.

Weeping Form

Weeping trees are always admired. Unfortunately we have been exposed too much to the troublesome willow and not enough to the aristocrats of this category. Some of those mentioned here are still quite rare, but they are gradually becoming available. The following represent small and very large weeping varieties:

Weeping scholar-tree *(Sophora japonica pendula)*. Contorted branching. Very slow.

Chrysanthemum weeping cherry *(Prunus serrulata rosea)*. Shell-pink flowers turning to white. In flower twice as long as *P. subhirtella.*

Weeping Siberian pea-tree *(Caragana arborescens pendula)*. Small tree with pealike, yellow flowers. Nice for small garden.

Weeping European ash *(Fraxinus excelsior pendula)*.

Globe locust *(Robinia pseudoacacia umbraculifera)* line this street.

Very interesting tree with stiffly pendulous branches.

Silver pendent linden *(Tilia petiolaris)*. Large tree to sixty or seventy feet.

Weeping European hornbeam *(Carpinus betulus pendula)*. As handsome as a tree can be.

Weeping European beech *(Fagus sylvatica pendula)*. Regal, immense.

Kilmarnock willow *(Salix caprea pendula)*. Large catkins. Golden stamens.

Round-Headed Form

While this is not an accepted botanical designation, it should be. All the forms listed are small—the largest to thirty feet in height—and they represent a wide variation in color and texture. Being small, they complement contemporary architecture, and they fill an equally valuable niche in advanced street planting because of their classic beauty:

Golden desert ash *(Fraxinus oxycarpa aureafolia)*. Golden bark. Green foliage turns gold in August and remains through fall.

Ruby-red horsechestnut *(Aesculus carnea briotii)*. Deep red flower spikes; good foliage.

Seneca sugar maple *(Acer senecaensis)*. A miniature of the beloved sugar maple, with the same gorgeous fall coloration.

'Rancho'(R) roundhead ash (*Fraxinus excelsior* 'Rancho'(R)). Symmetrical. Fast grower. Tolerant of poor soil.

Amur maackia *(Maackia amurensis)*. Unusual. Creamy white flower spikes in August; old coppery bark.

Some of the connoisseur trees, which have variegated foliage and outstanding bark color, I include in the classic tree category.

Variegated-Foliage Trees

Drummond maple *(Acer platanoides variegatum)*. Green leaves with white around edges.

Wineleaf maple *(Acer pseudoplatanus spaethi)*. Rich, deep green foliage with burgandy-colored underpart.

Golden-leaved catalpa *(Catalpa bignonioides aurea)*. Golden leaves, big, bold, coarse.

Purpleleaf catalpa *(Catalpa hybrida purpurea)*. New grow is deep purple, almost black, fading green, but overall appearance of tree is purple. Flowers small. Striking tree.

Ash 'Golden Desert' *(Fraxinus oxycarpa aureafolia)* Pat. Pend.

Tricolor beech *(Fagus sylvatica tricolor)*. Foliage pink, green, and white.

Golden sweetgum *(Liquidambar styraciflua variegata)*. Foliage speckled gold and green; fall color pink and red.

Welch dogwood *(Cornus florida welchii)*. White, pink, and green variegated foliage.

Bark

Paper birch *(Betula papyrifera)*. This has the whitest bark of all birches.

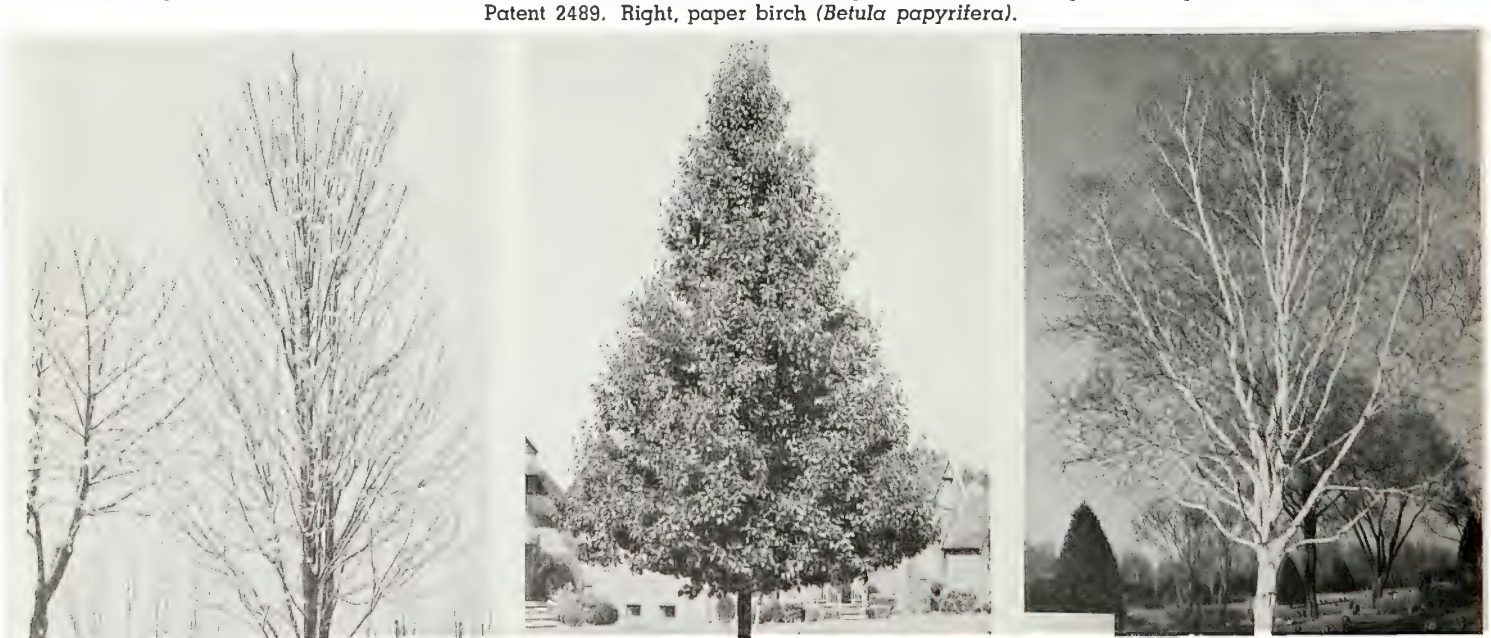
Redbark cherry *(Prunus serrula)*. Beautiful red, shiny bark feels like satin, and peels.

Cherrybark maple *(Acer griseum)*. Bark is cinnamon color, and peels.

Birdcherry *(Prunus maackii)*. Bark peels, turns orange.

All the classic trees mentioned above, and many other variations, have a very wide practical use in our contemporary civilization. Our cities can be expected to change radically in the next two and three decades because of the

Left, maple 'Scanlon' (*Acer rubrum* 'Scanlon') Plant Patent 1722. Center, pear 'Chanticleer' (*Pyrus calleryana* 'Chanticleer') Plant Patent 2489. Right, paper birch *(Betula papyrifera)*.



huge concentration of population in urban areas. This concentration and intensive use of land within the cities of the future is definitely going to restrict the space that will be available for trees.

When our cities began to take form in the last half of the nineteenth and the early part of the twentieth century, there was an immediate need in the warmer portions of the country for relief from oppressive summer heat. In those days also there were few underground sewer and drainage facilities. Sidewalks and overhead lines had not made heavy inroads into the space quotient of the embryo city. So almost any tree would serve the purpose; and the faster it grew, the better.

However, continued use of these fast-growing fringe trees began to dominate the landscape shortly after World War I. Planting of these trees should have been discontinued at that time, but because they produced instant shade, and results, it was deemed politically expedient to continue to do so. That this was a mistake is evidenced by the holocaust caused by the over-use of the American elm. The Dutch elm disease should be positive proof that the use of few species, and species of huge stature, is inadvisable.

The owners of small or moderate-sized urban properties realized many years ago that trees towering over a one story house was not exactly common sense. They wanted small trees, but had not been introduced to them. With the continued production of fast-growing forest-type trees and their wide and intense promotion throughout the country since World War II, the home owner was left floundering. Many, through no fault of their own, repeated mistakes.

The small home owner should plan the use of trees on his property. First and foremost in considering where to place a tree should be the location of the house. The home owner, having determined where he wants outdoor recreational facilities, should place trees to shade such areas on the basis that the south and west sides of the house are exposed to greater intensity of sun and heat.

Besides trees of classical stature or special garden effect, he can use a number of small trees of classical beauty. In this category can be listed the flowering crab-apples, Japanese cherries, and hawthorns.

Crab-apples

The crab-apples are fast-growing and tolerant of a wide range of soil conditions. They provide beauty during their flowering, desired shade in summer, and ornamental fruit from late summer through fall.

Some of the newer and more flamboyant varieties are: 'Liset', 'Profusion', 'Winter Gold', *zumi calocarpa,* 'Arnold', 'Aldenham', 'Van Eseltine', *baccata fastigiata,* 'Katherine', and 'Strathmore'.

Seventy-five-year-old weeping European hornbeam *(Carpinus betulus pendula)* on the palace grounds of the late Emperor Franz Joseph in Vienna, Austria.

'Rancho'® roundhead ash (*Fraxinus excelsior* 'Rancho'®).

Cherries

The Japanese cherries are equally presentable, but are very sentitive about "wet feet," which they will not endure. The cherries may be planted on south and west sides because their growth is also very rapid. All of the mentioned varieties mature at from sixteen to twenty-two feet, depending upon climate: 'Kofugen', 'Spring Glory', 'Pandora', 'Okame', chrysanthemum weeping, 'Amanagowa', Redgowa', 'Hokusai', 'Yedo', 'Tai Haku', 'Mt. Fuji', and 'Sieboldi'.

Hawthorns

The hawthorns should be used primarily on north and east sides because of their slower growth. In flower and fruit they are tremendously effective, but they do require a number of years to develop. The following are excellent in flower, fruit, and foliage: *Crataegus grignonensis, orientalis,*

(Continued on page 210)

A very classic planting—sheared *Tamarindus* in Bangkok, Thailand.

RECENT ADVANCES AND RECOMMENDATIONS IN CONTROLLING INSECT PESTS OF ORNAMENTALS

By DONALD L. SCHUDER

Dr. Schuder is Professor of Entomology at Purdue University, Lafayette, Indiana. The following article becomes Purdue University Agricultural Experiment Station Journal Paper 2531.

A WIDE RANGE of problems and situations present themselves to the gardener whenever he becomes involved in the control of insect pests of ornamental plants. The gardener is usually aware that a horde of insects lurks about, intent upon destroying his plants, but he may have difficulty in identifying the different insects and the signs of their damage. Further, the home gardener must select and use one of several available insecticides to alleviate the insect problem. Occasionally, destruction or damage can be alleviated or avoided without the use of a pesticide, but in order to control most problem pests, the gardener must rely on an insecticide.

During the past few years, much has been said and written about the possible deleterious effects of insecticides on birds, fish, and man. The fact remains, however, that insecticides are the most important means of controlling our insect enemies. It is also a fact that, with the vast number of pesticides in general usage, they have an excellent safety record. By carefully observing the normal safety precautions, such as following directions on the label, man can enjoy reasonable freedom from insects without endangering himself, his pets, or his feathered friends which frequent ornamental plants.

In the eastern United States during the past three or four years, we have witnessed some very unusual weather conditions—prolonged droughts with accompanying moisture deficits in our soil, severe winters with sudden temperature drops and periods of subnormal cold, widely fluctuating temperatures, and so on. These unusual conditions have been reflected in some different and unusual insect problems. Sod webworms, *Crambus* spp., have caused severe problems for the fanciers of fine turf, a condition aggravated by dry summers. Several scale insects have been unusually damaging. For example, the pine needle scale, which is usually found on pine trees in ornamental plantings, has been found to be moving into large pine plantations. The European pine shoot moth, a perennial problem in pine trees, has been extremely scarce, because it is killed by temperatures below —12°F. The eastern tent caterpillar and the fall webworm have increased in abundance, while in contrast the mimosa webworm's first generation has been very light each spring for the past two years. These observations indicate that weather plays an important part in the development of our insect problems, but, so far, man has been unable to do very much about controlling the weather. Because of this, other approaches to the control of insects are necessary.

It is the purpose of this article to bring to the attention of the readers of *The Garden Journal* some of the recent developments in the field of applied entomology.

Systemic insecticides, those chemical toxicants which are capable of being picked up by the plant and transported in the sap stream, have been publicized for several years, but have recently begun to be accepted for specific insect pest control. "Bidrin," as a tree injection, will soon be on the market for the control of the smaller European elm bark beetle, the efficient vector of Dutch elm disease. Other systemic insecticides, such as "DiSyston," show promise for the control of the mimosa webworm when applied and worked into the soil. Systemic insecticides have been widely accepted for control of such pests as the birch leaf miner, mites, and aphids. A single heavy drench or granular application has protected roses for a whole growing season. These insecticides, when injected into the tree or worked into the soil, have another advantage in that they have no effect on beneficial animals, such as parasites and predators, or on birds.

A bacterial pathogen of insects is finding usage in controlling insect pests. The bacterium, *Bacillus thuringiensis* Berliner, is effective against some species and ineffective against others. One ornamental pest which succumbs to the toxins of this bacterium is the eastern tent caterpillar.

Now that we have mentioned some of the current developments, let us turn our attention to some of the individual pests with which the home gardener may have to deal. The remainder of this article discusses some of the insect pests and lists methods for their control. For ease of discussion the topic is divided into mites, sucking insects, chewing insects, tree boring insects, leafminers, and galls.

MITES

Mites are not insects but tiny animals closely related to spiders and ticks. They are sometimes called "spider mites" because they spin silken threads over the host plant. Most mites are so small that they can barely be seen with the naked eye. The best way to be sure that mites are the cause of trouble is to hold a white sheet of paper beneath a branch and tap it sharply. If mites are present, they will fall onto the paper and can be seen as tiny specks as they crawl about. These specks, together with the typical speckling and bronzing, or webbing, of the foliage, indicate the presence of mites. Evergreens and deciduous trees are both subject to mite attack. Some of the mite species commonly associated with ornamental plants include the two-spotted mite or red spider, the spruce mite, the European red mite, the honey-locust mite, the privet mite. Any plants sprayed with DDT should be closely watched for mites, since these pests are not killed by DDT but many of their natural enemies are. It is always wise to include a miticide with DDT sprays to prevent mite buildup.

Mite problems are usually expected to develop during the hot, dry periods of summer, but the spruce mite, which attacks many of our needled evergreens, frequently is a problem early in the season. The mite overwinters in the

egg stage on the host plant and hatches on warm days in March; thus, as soon as warm weather prevails, they build up in tremendous numbers. Home owners should check their evergreens for the presence of the spruce mite early in May.

During the past fifteen years, a number of new chemicals have been developed for control of mites. These materials, called miticides, do not have any effect on insects. Some insecticides, such as dimethoate, phorate, malathion, and parathion, are effective against both mites and insects. Most miticides should be reapplied at periodic intervals throughout the summer in order to protect the plants throughout the growing season.

There has been much information written about the phosphate resistance of mites. While this is true in the greenhouse and in some orchards, it is seldom a problem in ornamental plantings.

Some of the newer, more effective miticides include "Kelthane," "Chlorobenzilate," "Eradex," and "Aramite." "Tedion" and "Ovotran," primarily ovicides, kill mite eggs and are most effective when applied before mite populations become abundant.

Sucking Insects

This group includes the various aphids, lacebugs, plant bugs, and leafhoppers which weaken plants by sucking out the plant sap. These insects frequently inject into the plant tissues secretions which injure or kill the plant cells, and some species transmit virus diseases of plants.

Aphids or Plant Lice: Nearly all ornamental trees and shrubs are subject to injury by aphids. These are small, soft-bodied insects which may vary in color from green to shades of red, brown, or black. The insects may attack both aerial and subterranean portions of the plant, but are commonly seen clustered on the new growth or the underside of leaves. When the population of aphids is heavy, they may cause the twigs and leaves to become curled and twisted, flower buds to become hardened, and flowers malformed. Aphids excrete a sweet, sticky substance called "honey-dew." This material is attractive to ants and flies and is a nuisance on cars, chairs, tables, and the like which are beneath infested plants. A black, sooty mold may grow on the honey-dew.

Aphids may be controlled during the summer by applying nicotine sulphate and soap, lindane, malathion, "Thiodan," or "Diazinon." Lindane or BHC is preferred for woolly aphids.

A forceful stream of water from the hose will help to remove sticky honey-dew from plants. Since ants frequently are involved in transporting and tending aphids, it is sometimes helpful to kill the ant colony by treating the nesting area with chlordane.

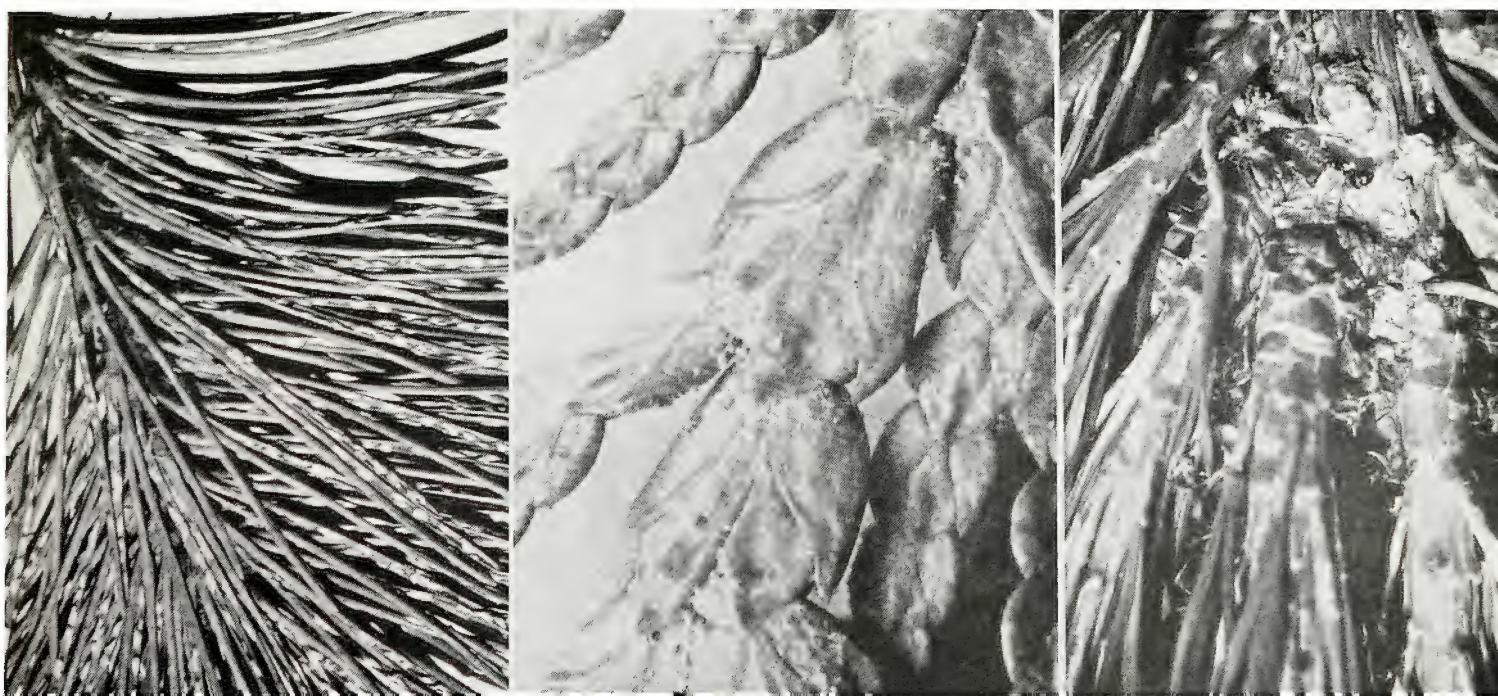
Lacebugs: Many trees and shrubs are attacked by species of lacebugs. The insects are about one-eighth of an inch in length, dark in color, with transparent, lacy wings. Both the adults and nymphs feed on the underside of leaves. They extract so much plant juice that the leaves become pale and mottled with white splotches. The lower surface of the leaves are spotted with black and brownish dots.

Lacebugs can be controlled by applying lindane, malathion, DDT, or nicotine sulfate the last of May. Be sure to treat the underneath side of the leaves. The new systemic insecticide, dimethoate, is also effective.

Leafhoppers: Leafhoppers are small, wedge-shaped, active insects which run, hop, or fly when disturbed. These sucking insects are usually yellow or greenish in color, while a few kinds are striped. Leafhoppers feed on the underside of the leaves, causing them to become light in color and marked with small, white dots on the upper surface. The cast skins of the nymphs often remain attached to the lower surface of the leaf and may serve as an aid in identifying the cause of the injury. Some species of leafhoppers are known to transmit tree diseases, such as phloem necrosis on elm.

The redbud or Judas-tree leafhopper has been very abundant on these trees during the past several years. Infested trees develop a yellow color in midsummer, an obvious signal that the trees need assistance. To prevent damage, DDT should be applied about the middle of June, or whenever the insects are discovered. Be sure to direct the spray to the

Left, pine needle scale is a common pest on most frequently grown, needled evergeeens. Center, spruce mite damage to arborvitae; the discoloration of the foliage and the presence of webbing and eggs are sure signs of mite infestation. Right, Zimmerman pine moth larvae are burrowing in the whorl region of Scotch pine.



underside of the foliage where the leafhoppers feed.

Plant Bugs: These small, shield-shaped insects are active and run or fly freely when disturbed. Both the adult and nymphal stages have sucking mouthparts. Several species of this group inject toxins into the plant, causing the parts attacked to wither and die. Terminal buds, shoots, and blossoms are commonly affected.

DDT is the best insecticide for controlling plant bugs. The best results are usually obtained by spraying early in the morning, because the insects are less active at that time. Preventive measures are important and include the removal of weeds, trash, and debris.

Scale Insects

Scale insects are serious pests of many ornamental plants, but unlike the other insects which suck sap from the plants, they are inactive during most of their lives. Scale insects are quite small, usually dark in color so that they are difficult to detect. Infested plants appear unhealthy, grow poorly, and the foliage may be small and chlorotic. For ease in identification, scale insects may be grouped into three divisions: (1) armored scales, (2) soft or unarmored scales, and (3) the mealybugs.

Armored scales are the most common type of scale insect found on trees and shrubs. The armored scales are quite small, varying in size from one-half to one-eighth inch in length or diameter, and may be circular, oblong, or pear-shaped. They secrete a hard, waxy covering over their bodies, and they feed and grow beneath this protective covering or scale. A typical life-cycle may be illustrated with the gray race of the oyster-shell scale which attacks the common lilac. These insects overwinter in the egg stage, beneath the female scale of the previous season. These eggs hatch the latter part of May or the first of June. The young scale, called a nymph or crawler, moves about over the host plant until it finds a suitable place to feed. It then inserts its needle-like mouthparts and draws its liquid food supply from the phloem tissues of the plant. At this time, the insect loses its mobility and goes through a series of five molts, casting off its skin before it reaches maximum size and sexual maturity. The males emerge as winged adults and fly about in search of the females. Eggs are laid underneath the female scale and the cycle is repeated the following season. Other species of scales have multiple generations, and the cycle just described may be repeated several times each year. In some species, no males are known and reproduction occurs without mating.

Species having one generation a year can be controlled by sprays in early June. This group includes Putnam scale, pit-making scale of sweet gum, scurfy scale, and the gray race of oyster-shell scale.

Species having two generations per year can be controlled by sprays in early June and again in late July. This group includes such common species as the pine-needle scale, the juniper scale, and the brown race of the oyster-shell scale. The latter commonly attacks redbud, dogwood, ash, poplar, and silver maple.

Multiple generation species frequently require sprays at monthly intervals for adequate control. Some of the species included in this group are the San Jose scale, euonymus scale, and the tea scale.

Soft, unarmored, or lecanium scales differ from the armored scales and have their waxy secretion as an integral part of their body. The body shape may be flattened, slightly convex, or hemispherical. They are larger than the armored scales, varying from one-twelfth to one-half inch in length. The eggs, laid beneath the female's body, hatch in one to three weeks. Development is slow and may require almost a year for a single generation. The nymphs of several of the soft scales feed on the leaves during the summer and move back to the twigs in the fall. Most species produce honey-dew.

Spraying for some of the unarmored scale species is necessary in June. This group includes terrapin scale, hickory lecanium, cottony maple scale, Fletcher's or the taxus lecanium, European elm scale, European fruit lecanium, and spruce-bud scale.

Spray application for other unarmored scale insects is required in mid-August. Common examples are the tuliptree scale, magnolia scale, and oak kermes.

Mealybugs are soft-bodied insects and are usually covered with a powdery, cottony-waxy material. Unlike the scale insects already discussed, the mealybugs have legs and are able to move about throughout their entire life. They vary in size from about one-fifth to one-third inch in length when fully grown. The female mealybug deposits her eggs in a white, cottony sack. The species noticed on ornamental trees and shrubs produce two or more generations each year. Some common mealybugs are the grape or taxus mealybug and the juniper mealybug.

Control of Scale Insects

The control of scale insects is often difficult because of failure to obtain adequate spray coverage. To be effective, the spray material must come in contact with the insects. Care should be taken to see that the spray is evenly applied to all parts of the plant. The addition of a wetting agent to the spray mix will help wet the insect and insure penetration through the insect's protective covering.

Scale insects may be controlled during both the dormant period and the growing season. During the dormant period, apply dormant oil, lime sulfur, or one of the dinitro (DN) compounds. When the scale insects occur on oil-susceptible plants, use superior or summer oils. Dinitro compounds and liquid lime sulfur will discolor paint and stone and should be used with caution around home plantings.

Summer crawler sprays should be timed to coincide with egg-hatch. The most commonly available and effective material for summer application is malathion. The insecticide carbaryl, sold commercially as "Sevin," has been found to be very effective against many of the lecanium scales. Other insecticides which have been shown to be effective against the scale crawlers are ethion, "Trithion," phosphamidon, "Guthion," demeton, "Diazinon," "Chlorthion." Dimethoate, one of the systemic insecticides, has given almost perfect control of scale insects when sprayed on the plant, applied as a soil drench, or as granules cultivated into the soil.

Chewing or Leaf-feeding Insects

Leaf-feeding or chewing insects include those species which consume solid foliage tissue. Members of this group may skeletonize the foliage or entirely defoliate the plant.

The Bagworm: The bagworm is a general feeder, attacking the foliage of both deciduous and evergreen trees and shrubs. It is so named because the caterpillar spends its life inside a silken, spindle-shaped bag, which is usually adorned with bits of twigs and leaves from the host plant. The bag looks so much like a part of the tree that it usually goes unnoticed until extensive damage has been done. The bagworm overwinters in the egg-stage inside the old bag. The eggs hatch in late May and early June. The young caterpillars immediately spin bags and continue to enlarge them as they grow. When the bagworm larvae mature in late August and early September, the bags are about two inches long. The bags are then attached firmly to twigs or branches and the worms pupate and change into adults. There is only one generation each year.

When only a few small trees are involved, bagworms can be controlled by hand-picking the bags and burning them. This may be done at any time when the bags are discovered, but is most easily done during the fall and winter, or early spring. Spraying is the most effective method when the trees are large or numerous. The sprays are most effective when applied in early June, as soon as possible after the eggs hatch. Several insecticides are effective. Malathion is the most widely accepted material. Other materials which have been recommended include "Diazinon," toxaphene, and lead arsenate. A new insecticide, "Vapona" (DDVP), is especially effective late in the season when the caterpillars are difficult to kill.

Sod Webworms: Several species of sod webworms have been destructive in turf the past several years. This insect kills irregular patches of turf by eating the leaves of the grass plant. The insect is unique in that it seems to attack the best bluegrass lawns in the neighborhood. The insects overwinter primarily in the egg-stage. There are two to three periods of adult flight with peaks of abundance in early June, mid-July, and late August. Chlordane, the insecticide generally considered to be a turf panacea, is no longer effective against sod webworms. In some areas dieldrin is still effective, but in many areas a phosphate insecticide such as "Dylox," "Diazinon," or ethion is required. The granular formulations are usually more effective than a spray, and they are easier to apply with the modern fertilizer spreaders. The best time to apply chemical control is between mid-May and mid-June. A second application can be made in mid-July, but applications in the fall have very little effect, since most of the insects overwinter in the egg stage.

Blister Beetles: Blister beetles are active, black, gray, or striped insects which appear suddenly in enormous numbers during the summer and strip the foliage from some species of ornamental trees and vines. The beetles are long and cylindrical; they have an unusual appearance because of their long legs. This group of insects is difficult to control. The best control has been obtained by applying five per cent granular dieldrin to the soil beneath the trees or vines. The insects are killed when they return to the soil in the cooler parts of the evening and night. Sprays or dusts of cryolite, chlordane, and DDT have also been suggested.

Leaf-Feeding Caterpillars: Caterpillars, the immature stage of butterflies and moths, exist in a wide variety of sizes and colors. Some may be covered with hairs and spines, while others are entirely naked. They may feed singly or in large colonies. All species have voracious appetites and consume large quantities of foliage. Most species are easily controlled with DDT sprays. In the case of some of the webworms, it is essential to use high pressure so that the foliage inside the web is covered with the insecticide.

The Zimmerman pine moth continues to spread in the northeastern United States. Symptoms of infestation by this pine pest include wilting terminals and laterals in late June and early July, dead discolored branches in lower whorls, and even entire trees may be off-color when the lower whorls have been attacked and partially girdled. The larvae, which are about an inch long, are pink or green in color and liberally sprinkled with black dots. They tunnel in the pith area of the new growth and beneath the bark in areas of the whorl. Pupation occurs in late July; adult emergence begins in August with peak abundance in the middle of the month. Eggs are deposited beneath flakes of bark. The eggs hatch in a few days and the larvae construct a small, cocoon-like hibernaculum in which they overwinter.

Left, mite damage to a white oak leaf; note the brown spots, webbing, and eggs. Center, maple bladdergall on silver maple leaves: this mite-induced gall causes distortion of the foliage but does little harm to the tree. Right, vein pocket and marginal fold galls on pine oak leaf; these galls are caused by two species of tiny midges.

The fruiting stage of sooty mold growing in the honey-dew produced by the pine leaf aphid.

Controls consist of both spraying and sanitation. Heavily infested brood trees should be removed and burned as soon as discovered. Spraying should be done with high-pressure, high-volume equipment either in mid-August or mid-April. Suggested insecticides include "Zectran," "Guthion," or a mixture of DDT and phosphamidon. The early spring application also has the advantage of assisting in the control of the European pine shoot moth, the European pine sawfly, and leaf-rollers.

Leaf Beetles: "Leaf beetles" is a term applied to several species of hard-shelled beetles of many sizes and colors which feed upon the foliage of shade trees and shrubs. They may eat holes in the leaves, as in the case of flea beetles, or they may devour the foliage completely. Common examples are the elm leaf beetle and the willow-poplar leaf beetle. Leaf beetles may be controlled by spraying when the leaves are three-fourths expanded, or whenever the insects are found, with dieldrin or DDT. DDT may cause an increase of mites, so incorporate a miticide in the spray. Lead arsenate is also effective.

Leaf Rollers and Leaf Tyers: The caterpillars included under this heading are described separately, because the injury is seen more frequently than the insects which do the damage. The caterpillars are mostly small, greenish yellow, and about three-fourths of an inch in length when mature. These larvae feed in concealment which they provide for themselves by rolling, folding, or tying leaves together. Control of this group of insects involves early application of the insecticide before the larvae have completed their shelters. The most commonly recommended control is TDE. Arsenical sprays are also of considerable merit. Other newer insecticides which have shown promise in leaf-roller control include endrin, "Phosdrin," "Trithion," "Sevin," and "Guthion."

Sawflies: Many shade and ornamental trees are attacked by colonies of caterpillar-like larvae which strip the plant of its foliage. The larvae have five pairs of prolegs, and the adults have transparent wings and a sawlike ovipositor, hence the name. Some species are called slugs, because they superficially resemble small, naked snails. The latter group skeletonizes the foliage by eating off the lower surface of the leaf. Sawflies are easily controlled with applications of DDT.

The European pine sawfly can also be controlled by spraying with a specific polyhedral virus disease. The material is sprayed on as a very fine mist either by airplane or hand equipment in early May. The advantages of this virus application over an insecticidal one are: The virus does not need to be applied every year. Mortality of the larvae is about eighty-nine per cent. This mortality becomes evident in about ten days or two weeks and prevents serious damage to the trees, but allows sufficient survival so that the disease is carried over from one season to another indigenous in the sawfly population. Recurring epidemics of the disease keep the populations so low that no economic damage occurs. The virus is transmitted from one generation to the next via the eggs of diseased females. Little or no virus persists on the foliage.

The virus disease does not affect other pest populations and is harmless to man and other animals.

Borers and Boring Insects

The larval stage of some beetles and moths are called borers. Some of these insects work in the terminal shoots, while others work beneath the bark, frequently girdling and killing the tree; still others tunnel in the heartwood, which makes the tree subject to rots and windthrow. A few species of boring insects are capable of attacking healthy trees, but the majority attack trees and shrubs only after they have been weakened or injured from some other cause, such as transplant-shock, drought, flooding, and dirt-fill over the roots. The presence of borers is often not evident until it is too late to save the tree; therefore, preventive measures are of the utmost importance. Spray the trunk of transplanted trees with dieldrin, DDT, or lindane before wrapping. Be sure to use wettable powder formulations, since oil formulations may injure the bark when the trees are wrapped. Wrap the trunk of the tree with commercial borer wrap, burlap, or even with aluminum foil.

The beetles which act as borers are classified into three groups:

1. Flat-headed borers—the sun-loving, metallic-colored wood borers of the family *Buprestidae,* the larvae of which

Elm leaf beetles, and their damage to Chinese elm leaves.

work in the cambium region.

2. Round-headed borers—the long-horned beetles of the family *Cerambycidae*, the larvae of which bore into solid wood.
3. The bark beetles—the shot-hole borers of the family *Scolytidae* and others. The larvae and adults work in the cambium region and are attracted to weakened trees.

The larvae of some of the common moths also infest the trunk and larger branches of trees. Common examples are the carpenter worm, leopard moth, peach-tree borer, and dogwood borer.

Borers may be killed by spraying before the young larvae hatch from the eggs on the bark. The sprays should be applied at monthly intervals during May, June, and July. Direct this spray at the trunk and larger branches. Materials which have been found effective are dieldrin, DDT, lindane, and BHC.

Borer larvae in the cambium beneath the bark may be cut out with a sharp knife. The exposed wood should then be treated with a good wound paint.

Borers in the wood can sometimes be killed, if the tunnel is first cleaned out with a piece of wire and then nicotine sulfate, malathion, or carbon disulfide injected into the hole. The hole should be sealed with mud, putty, or caulking compound after injection, to confine the fumes.

Leaf-miners

The category of leaf-miners contains many different kinds of insects, the larvae of which feed between the upper and lower leaf surfaces. This feeding may take the form of tunnels which may be either straight, serpentine, or blotch. Some of the more common leaf-miners are the holly leaf-miner, arborvitae leaf-miner, boxwood leaf-miner, birch leaf-miner, locust leaf-miner, hawthorn leaf-miner, and the gregarious oak leaf-miner.

The control of leaf-miners depends largely upon proper timing of the insecticidal application. If the insecticide is not present on the foliage before the adults lay their eggs, the larvae already inside the leaves may not be killed. The first application should be made early in May, and applications should be repeated at monthly intervals for the species which have more than one generation a year. Insecticides commonly suggested for the control of leaf-miners are DDT, dieldrin, and lindane. Other insecticides which show promise in the control of leaf-miners are ethion, "Trithion," "Endothion," malathion, and "Dibrom." Some of the systemic insecticides, such as "Cygon," phosphamidon, and phorate, have given long-lasting effects when applied to the soil in mid-April. Use a five-per-cent granular formulation, applying up to one half ounce of actual insecticide per inch of trunk diameter at chest height, or one pound of actual toxicant per acre.

Galls

Galls are abnormal growths on leaves or petioles, induced by various insects, such as midges, wasps, and aphids. Each species of insect produces a characteristic gall formation, varying from the simple to the grotesque. Several mites also produce galls, of which the hackberry witches' broom and the maple bladder gall are common examples. Oak and hickory trees are the favorite hosts for several hundred different gall insects.

The bagworm is a common pest on evergreen and deciduous trees and shrubs.

Damage from galls is rarely serious enough to justify chemical control, and since the gall tissue protects the insect inside, sprays applied after the galls have developed are ineffective. When only a few galls occur, they may be pruned off and destroyed by burning.

Individual trees which have been heavily attacked by galls in previous seasons may be protected by preventive sprays applied early in the season. Dormant sprays of liquid lime sulfur are effective in preventing attack by Cooley's spruce gall, the eastern spruce gall aphid, ash flower gall, and the maple bladder gall. Where staining by lime sulfur makes its use impractical, delayed dormant sprays (applied just as the buds are swelling) of malathion are equally effective. Similar sprays of malathion and lindane are effective in preventing hickory pouch galls. Several galls, such as the hackberry nipple gall, vein pocket gall, the marginal fold gall of pin oak, honey-locust pod gall, and the gouty oak gall have been successfully prevented by applications of insecticides when leaves are about three-fourths expanded. The insecticides with the best results have been dieldrin, "Sevin," malathion, lindane, and DDT. Treating the soil beneath infested trees in early spring and in the fall with the above materials is helpful. The aerial and subterranean galls of woolly apple aphids on crab-apples have been prevented by monthly application of phorate and demeton. Apply the sprays to the soil, trunk, and foliage.

Spraying

Successful control of insect pests depends upon thorough coverage. The type of sprayer depends upon the extent of the plantings to be protected. Small shrubs and roses may be adequately protected with the various commercial sprayers which attach to the garden hose. Small trees, thirty-five feet in height, may be adequately covered with a small hydraulic sprayer; however, tall trees, such as the American elm and the oaks, require hydraulic sprayers with both a high-pressure and high-volume pump, or one of the new air-blast sprayers or mist blowers. Sprayers of these types would be too expensive for the home gardener. If large trees are to be protected, it is advisable to call in a commercial arborist.

General Purpose Sprays: Frequently a general purpose spray is requested for ornamental plants. Usually such a material applied in a regular spray schedule is not practical.

(Continued on page 210)

A CHINESE BOTANIST IN AMERICAN GARDENS

By SHIU-YING HU

Dr. Hu is a botanist at the Arnold Arboretum Harvard University, Cambridge, Massachusetts.

Of the many interesting places visited, a number have been described at length in previous issues of *The Garden Journal*: Arnold Arboretum, Clarence L. Hay Estate, Desmond Arboretum, Sterling Forest Gardens, Old Westbury Gardens, Bayard Cutting Arboretum, Planting Fields, the plantings at Princeton University, Morris Arboretum, Arthur Hoyt Scott Horticultural Foundation at Swarthmore College, Winterthur, Longwood Gardens, Dumbarton Oaks, U. S. National Arboretum, and Mount Vernon. So the Editor has selected a few excerpts from Dr. Hu's account of the trip through the areas in which the foregoing are located and publishes her account of the Washington, D. C., and Virginia areas in its entirety.

IN OCTOBER, 1963, I had the good fortune to be a participant in a tour of some fifty outstanding gardens in eastern United States. This tour was organized by the International Dendrology Union (I.D.U.), a small association established in Brussels in 1952. The aim of this organization is "to be a link between dendrologists throughout the world and to cooperate whenever possible with existing societies of dendrology, in order to further the science of woody species and to encourage the formation of collections of trees and shrubs."

The I. D. U. has organized spring and autumn tours to visit gardens in various parts of Europe—in Belgium, Denmark, England, Germany, northern Ireland, Portugal, the Riviera, and Scotland. The tour described here was its first in the United States of America.

Fourteen people participated in the entire tour which began in Boston and ended in Williamsburg, Virginia. In addition to those shown in the accompanying illustration were Baron and Baroness Paul de Favereau de Jeneret who came from Belgium for the entire trip, the Hon. Mrs. Terrence O'Neill of Ireland, who joined the group only for the gardens on Long Island, New York, and Richard Fillmore of Duke University, North Carolina, who joined the party for the Washington and Williamsburg portion.

In describing the activities of the tour, a few names of the participants are mentioned repeatedly. These are the Duchess of Abercorn, whose husband is the President Elect of I.D.U., Robert de Belder, the Treasurer, Dr. Clement G. Bowers, America's rhododendron specialist, and Harold Hillier, the nurseryman and seedman to H. M. Queen Elizabeth and the Queen Mother, a member of the managing Committee of I.D.U., and the proprietor of Hillier & Sons, the world's best-known nurseries.

In routing the gardens of eastern United States to fit into an eighteen-day tour, the planners could select only one or two examples each of private arboretums, national forests, research institutions, governmental experiment stations, private estates occupied by the owners or left in trust to nonprofit foundations or to the care of the National Park Service, restored eighteen-century gardens, and former plantations. Even so we found that our schedules were overwhelmingly crowded.

WHITE MOUNTAIN NATIONAL FOREST, NEW HAMPSHIRE

By the middle of the afternoon on October 4th, we entered the White Mountain National Forest at Warren. The combined effects of both the latitude and the altitude on the life of the trees became evident. Although the red or brown leaves of some oaks were still hanging on the trees, the branches of the maples were bare. Looking over the top of the lower mountains to the horizon, we had a peaceful view of soft gray spotted with red, brown, and green. The

Members of the International Dendrology Union on the eastern United States tour, from left to right: 1. Dr. Donald Wyman, 2. R. Lenoir (Belgium), 3. Mr. Herbert (Massachusetts), 4. Mrs. Robert de Belder (Belgium), 5. Harold Hillier (Great Britain), 6. Dr. Shiu-ying Hu, 7. Mrs. R. Lenoir, 8. The Duchess of Abercorn (Ireland), 9. Bernard Harkness (Rochester, New York), 10. The Duke of Abercorn, 11. Mrs. Mary Williams (England), 12. Dr. Clement G. Bowers (Maine, New York), 13. Mrs. Donald Wyman, 14. Lord Talbot de Malahide, 15. Robert de Belder, 16. Mrs.Clement G. Bowers.

bus stopped several times to permit us to examine more closely some of the species in the forest and to collect some fruits and seeds. Harold Hillier and Robert de Belder were always the first ones to get off the bus and the last ones to return. Their sharp eyes and quick feet rewarded them with pockets and hands full of nuts, berries, and other specimens.

We passed by many historical spots and recreation facilities, the Old-Man of the Mountain which inspired Nathaniel Hawthorne to write the *Great Stone Face,* and Mt. Washington, the highest mountain in northeastern United States. We reached North Conway by nightfall and were happy that good food and hot baths were waiting for us there. Through Dr. Wyman's careful planning, on this long-day's ride, we were constantly driving away from the sun so that we could be in the best position to see the maximum brillance of the colorama.

October 5th was another long day—leaving North Conway at 8:30 a.m., we drove through three states, namely New Hampshire, Vermont, and Massachusetts. The magnificent view of snow-capped Mt. Washington bathed in the quiet rays of the rising sun was an unforgettable experience. Presently we were on the newly opened Kanocamagus Highway and entered the undisturbed wilderness. Ice, rain, wind, and other implements of Nature have carved the sides of mountains into vertical cliffs. At this season, and in our position, we could not perceive any visible vegetation except small clusters of deformed trees here and there decorating the crests of the ridges. Our eyes were confronted with constantly changing scenes, and I felt as if I were moving in an endless gallery of Chinese landscape paintings.

After covering the eastern one-third of the Kanocamagus Highway, we stopped at the Rocky Gorge Scenic Area for a closer observation of the vegetation and to collect some seeds and fruits. *Betula papyrifera* with its conspicuous white bark forms pure colonies on the margin of the forest along the river. In the interior of the forest *Picea canadensis* and *Pinus resinosa* are the dominant species. *Chimaphila umbellata, Epigaea repens, Vaccinium canadense,* and *Viburnum prunifolium* are common species in the undergrowth. *Aronia prunifolia* displayed the most brilliant red foliage.

The effect of the water supply on the composition of the forest is very evident. Along the river, the dominant species are of *Tsuga* and *Acer,* while on the higher slopes they are of *Picea* and *Betula.* The differences in the composition of the forest are reflected in the coloration of the foliage. Along the river, the coloration is the most brilliant; higher on the slopes it is predominantly green with some yellow; on the upper half of the mountain, it is pure green.

After covering two thirds of the highway, we came to a point marked "2855 feet." Thence we passed to the western side of the range where the mountains are covered with deciduous trees. We came to an area labeled "Wangan Ground" and stopped at Vistas to enjoy the breath-taking panoramas of the awe-inspiring mountains and valleys. Immediately Mr. Hillier and Mr. de Belder were out of sight. They went far down the valley and deep into the forest, so far out of reach that the driver had to blow the horn repeatedly to call them back. They returned running, completely satisfied, hands full, pockets bulging, feet wet, and clothes soiled. Mr. Hillier had stumbled into a swamp. It was fitting that the Duchess of Abercorn invented a nickname for them, "Plant Pirates."

In New York State

Our second stop in New York on October 6th was at Amenia, where we visited the garden of Mrs. Albert D. Lasker. The house is situated among large trees, species of *Acer, Juglans, Picea,* and *Pinus.* In it there are numerous paintings of Radul, Dufy, Dali, Mariset, Bombois, Braque, Andre, Bauchara, and others. The ground was decorated with thirty-five hundred pots of chrysanthemums, predominantly pink (these are replaced by four thousand pots of tulips in the spring). There is a large geometric garden with a beautiful lawn and roses surrounded by pines. The impression of the touring members about this garden were very diverse. Admirable comments "What a dream place!" were mixed with "What a pity that in a beautiful country such as this, people spend so much money on an artificial garden."

Eastern New York is a land of pastures. Very little forest is left and this is usually on top of rolling hills. Species of *Acer, Fraxinus, Juglans, Pyrus, Pinus,* and *Ulmus* are frequently seen. Colonies of *Larix laricina* are not uncommon in swampy areas. We drove through Millbrook, an area famous for gracious living, in which many people of New York City have large estates.

In Poughkeepsie we met Henry E. Downer, former Superintendent of Grounds of Vassar College, who was trained in the Royal Botanic Gardens at Kew. Under his supervision, Vassar has developed a magnificent campus. He knows the gardens, parks, and large estates of the Lower Hudson Valley, and we were indeed fortunate to have him as guide for the rest of the day.

The F. W. Vanderbilt estate, established in 1835, is now operated by the National Park Service. We were told that it has the first *Ginkgo biloba* introduced into North America. Here we saw very large specimens of *Abies concolor, Acer saccharinum, Betula lenta, Fraxinus exelsior, Fagus sylvatica* f. *pendula* and f. *laciniata, Gymnocladus dioica, Pinus strobus,* and *Tsuga canadensis.*

A good part of October 7th was spent in the Brooklyn Botanic Garden with Dr. George S. Avery, the Director, and other members of his staff. There are many unusual specimens in this garden. There is a *Cudrania tricuspidata* with a trunk fifteen centimeters in diameter and a crown of ten meters across. Such a large specimen is not known even in China, which is its native home. A wisteria has a trunk twenty-five centimeters in diameter. Several specimens of *Zanthoxylum simulans* of a globose, compact form are most attractive with feather-like, spinose, shiny dark green compound leaves; corymbose clusters of dark red fruit; and glittering, glossy black seeds on the margin of open pericarps. Although the old saying, "All that glitters is not gold," is true, the fruit of this species can be turned into gold easily. A large importation of the dried pericarps is brought into the United States to meet the demand for spice and medicine by Chinese-Americans.

Another striking specimen in the Brooklyn Botanic Garden is a planting of forsythia 'Arnold Dwarf' as a ground

and wall cover. The triploid, large-flowered sister-form, forsythia 'Arnold Giant', is a horticulturally well-known cultivar and has won a gold medal at the Royal Horticultural Society's flower shows in Britain, but this dwarf form is little known and it has never flowered. In my student days, while weeding the nurseries of Dr. Karl Sax's hybrids as a summer job, I saw this cultivar buried in tall grasses along the edge of a plot at Bussey Institute. I never dreamed that it could be so charmingly applied in gardens as it is at the Brooklyn Botanic Garden.

With its more than seven hundred cultivars the rose garden is a superb living museum of roses. We walked leisurely to the fragrant garden designed primarily for the blind; it is neat and attractive. We could not restrain our excitement and admiration, when we entered the gate leading to the two-acre area with woodland, pond, sand dune, and numerous small birds taking their morning bath in a spring under large native trees. We were delighted to know that the dwellers of metropolitan New York can experience the life of a small wilderness without traveling far.

We saw the Japanese garden with its unique oriental design and plantings. The four small and large bodies of water form the shape of the Chinese character "heart," which may also be interpreted as "mind." The scarlet torii (gateway to heaven) and the harvest temple stand for the serene and peaceful culture of the common people of eastern Asia. They are concrete objects of educational as well as aesthetic value. Our unique experience came to a climax on the visit to the replica of the stone garden of Ryoanji. As we entered this secluded place, each one was given a pair of paper slippers. Following Dr. Avery's example, we took off our shoes and put on the slippers.

Architecturally this garden is an enclosed tennis court, seventy-five by thirty-one feet in size, covered by white, crushed stone which is ripple-raked to suggest the waves and currents of the sea. On this court fifteen rocks are arranged in five groups, each surrounded by a narrow strip of mosses, suggesting the continents and islands. This garden is designed for repose and meditation. Comprehending Dr. Avery's sign language, we all sat on the steps and meditated.

In Pennsylvania

Unlike many other gardens the Barnes Arboretum is not a show place, but it is a manifestation of the love of plants of one person, Mrs. Albert Barnes, and an expression of her willingness to share her knowledge of plants with others. Mrs. Barnes, who is eighty-eight years old, works in her garden daily. She met us outside the house and told us that botany and genetics are offered to thirty adults free of charge. The arboretum is very rich in tree and shrub species, many of them originally introduced and distributed by the Arnold Arboretum. They could not survive the Boston climate but here they grow very well: *Aucuba japonica* f. *nana, Aesculus turbinata, Buxus harlandii, Clethra fargesii, Cunninghamia lanceolata* f. *glauca, Hovenia dulcis, Idesia polycarpa, Ilex pernyi,* and *Photinia serrulata* being a few examples. *Symplocos paniculata,* which is normally a shrub, attains tree-form in this arboretum; its trunk is about five centimeters in diameter. Two specimens of *Idesia polycarpa* are ten to twenty meters high; they are very attractive because of their smooth bark, cordate leaves on pink petioles, and paniculate, yellow fruit. A bigeneric hybrid, *Fatshedera lizei,* which one often meets as a house plant, grows happily in the garden; it is about one meter high. A specimen of *Hovenia dulcis* is about thirty meters high, its trunk about seventy-five centimeters in diameter. I have seen numerous specimens in the forests, gardens, and temple-grounds in China, and have eaten an abundance of its enlarged, zigzag, fleshy, apple-scented, sweet peduncles, but this tree is the

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This "lovely ungreen garden where nothing green grows," exquisite in its scale and in its proportions, is a replica of the five-hundred-year-old Ryoanji Temple Garden of Kyoto, Japan, in the Brooklyn Botanic Garden.

THE EXPEDITION OF THE BRAZILIAN-VENEZUELAN BOUNDARY COMMISSION TO CERRO DE LA NEBLINA

By PAUL ORT

Dr. Ort, who is a member of the staff of the Bronx-Lebanon Hospital Center, Concourse Division, accompanied the expedition as physician.

THE BRAZILIAN-VENEZUELAN BOUNDARY COMMISSION conducted its last expedition in the spring of 1964 in the region of Cerro de la Neblina. It started from points of earlier explorations in the western part of the mountains and determined a part of the boundary beginning at Cerro Cupy and continuing to the southeast, toward the central part of Cerro de la Neblina. After this, the expedition approached Cerro de la Neblina from the south in order to determine the watershed of the Amazon and Orinoco rivers in the central part of the mountains. At the end of the exploration the Commission approached Pico Phelps, reaching an altitude of approximately twenty-one hundred meters.

THE ORIGINAL EXPLORATION OF THE BOUNDARY COMMISSION[1]

The determination of the boundary is based on the Frontier Treaty that Venezuela signed with Brazil in Caracas in 1859; since that year the boundary has been explored by successive expeditions of the Brazilian-Venezuelan Boundary Commission. The first exploration in the region of Cerro de la Neblina was conducted in 1879 by the Baron de Parima who determined the position of the Piedra de Cocuy, Salto Huá, and Cerro Cupy. In 1912 and 1914-1915, and later in 1930, the Commission established the position of the geodesic line between Piedra de Cocuy and Salto Huá. It also corrected the coordinates found by the expedition in 1879.[2]

During the past ten years the Commission examined successively the main left-hand affluents of the Rio Negro thus determining the boundary between Venezuela and Brazil in direction from west and east. The sources of the following rivers were explored: Catrimani, including exploration of the origin of the Orinoco in 1956, Padauiri, and Marauia.

In 1963 the Commission returned to Cerro de la Neblina. This mountain range was newly described by the expeditions of The New York Botanical Garden in 1955 and 1958, which also determined the highest elevation and named it Pico Phelps.[3] During the reconnaissance flight that preceded the Brazilian-Venezuelan expedition in 1963, the question was raised whether the newly described Pico Phelps was located entirely in Venezuela or in Brazil or formed the boundary between both countries. Nevertheless, the same expedition explored only the western part of the mountain range and confirmed the position of the geodesic line between Salto Huá and Cerro Cupy.

THE EXPEDITION OF 1964

The Venezuelan part of the expedition left Caracas January 22, 1964, three men in number: George Pantchenko, astronomer, Jacques Monet, topographer, and I, Paul Ort, physician. The military airplane brought us from the airbase in Palo Grande to Esmeralda on the upper Orinoco. There we met three men who formed the crew for our

Fully charged boats of the Boundary Commission on Rio Negro: forty-foot "bongo" carrying three tons of charge and aluminum "voladora" equipped with 95 HP motor Mercury.

three boats—one forty-foot bongo and two small aluminum boats, all equipped with outboard motors. Two days later we left Esmeralda and spent a night at an American New Tribes Mission in Tama-tama near the division of the Casiquiare from the Orinoco. The passage through Casiquiare to its mouth in Río Negro took us four days, since we had to overcome many rapids because of an unusually low level of water during that summer.[4] The seventh day we crossed the Brazilian-Venezuelan boundary at Piedra de Cocuy. On February 2, we crossed the equator and four days later met the Brazilian part of the expedition (sixty-two men in number) on the beautiful island Jerusalem, near the mouth of the Cauabury. The Cauabury, which originates in Cerro de la Neblina, should have brought us to the proximity of the mountains.

We were sailing ten days on the Cauabury before we reached the mouth of the Maturaca, the water of which originates in Venezuela where it is a part of the Baria.[5] On the sketch map No. 2 is seen the division of the Baria near Cerro Cupy. Six kilometers upstream from the mouth of Maturaca, we arrived at a Roman Catholic Mission where three priests and two Brazilian families were living at that time. There we met for the first time the Uaica Indians, who occupy the immense territory between the head of the Orinoco and the Rio Negro. The Maturaca Mission, which is built on a small hill, offers a beautiful view of the first chain of mountains forming Cerro de la Neblina. Their names are from west to east: Cerro Onori, Pirapuku, Cerro Tuparuri, and Parabuei.

The territory through which the Cauabury flows is a vast solitary area. Along the two hundred and fifty kilometers of its course we met only one group of prospectors, who were examining the possibilities of mining diamonds in that region. About the middle of the course of the Cauaburi, at the place called Cachoeira de Destacamento, we found the ruins of the Portuguese fort, the vestige of colonization. It consisted of an irregular wall about three feet in height and fifteen feet in length, built up from big granite stones. The rest was devoured by the jungle and only the secondary vegetation gave testimony of the former life.

The channel Maturaca at its mouth in the Cauabury. In the rear is Cerro Onori, the eastern most part of Cerro de la Neblina.

At the mouth of the Cauaburi the expedition divided in two groups. One followed the Maturaca to the Salto Huá with the purpose of confirming the part of the boundary starting at Cerro Cupy, which had been determined the previous year only by the Venezuelans. It was at this time that we observed Pico Phelps from a distance of approximately seventeen kilometers to the west.

The second group followed the Cauabury which deviates toward the east from the original northern direction. They passed the mouths of the Maricibuei and Tucano Rivers and finally entered the Titirico, all right-hand affluents of the Cauabury, originating in Cerro de la Neblina. Since

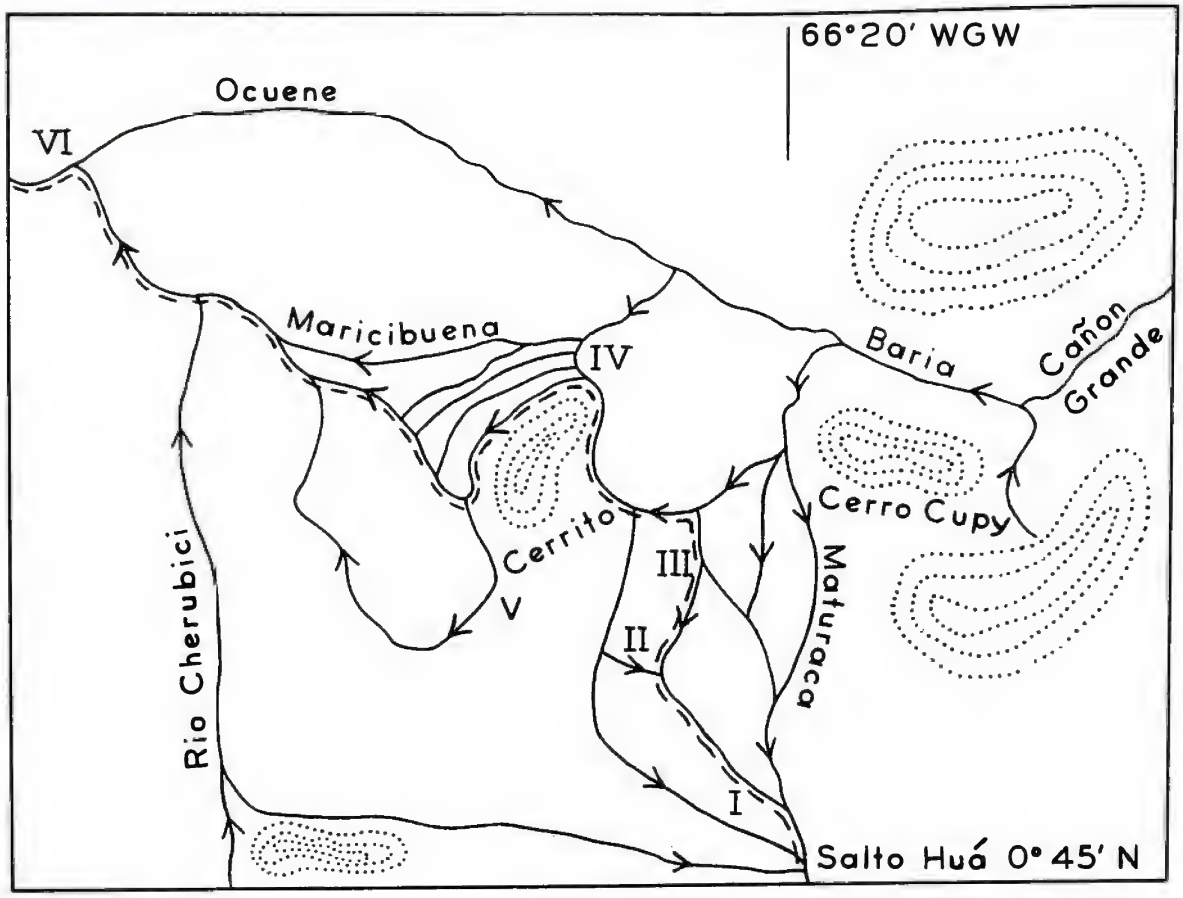
View of Cerro de la Neblina from Maturaca Mission: pointed Cerro Pirapucu on the left and saddle-like Cerro Tuparuri on the right.

Continuation of the mountain range forming southern aspect of Cerro de la Neblina: eastern part of Cerro Tuparuri on the left and the massive Parabuei on the right.

this was unexplored region, we accepted the names that the Uaica Indians had given to the rivers and mountains. The Cauabury itself runs all along the southern aspect of Cerro de la Neblina, having the smaller Cerro Mayo on its left-hand side. At the eastern end of Cerro de la Neblina, it possibly turns again to the north and even west, thus originating in the eastern slopes of the Cerro de la Neblina. The second group built the main camp on the Titirico and explored its small affluents in the direction of the frontier. The exploration was not completed because of the advanced winter and will be the basis for the next expedition in 1965.

In the mean time the first group returned to the Maturaca Mission and continued in the direction of Cerro Tuparuri, supposing that it formed the actual watershed between the Amazon and the Orinoco. Its geographical position was established by means of astronomical observations, and the impression was gained that the frontier turns from

Island Jerusalem on Rio Negro, near the mouth of the Cauabury.



Field sketch map of the communication between the Baria and the Maturuca. The Roman numerals indicate the camps of the expedition.

Map drawn—and modified—from the map that was prepared for *The Geographical Review*, New York, 1955.

RIO BARIA
ERUBICHI TRIBUTARY
BRAZO DE ERUBICHI
CANAL MARICIUENE
CANAL OCUENE
RIO BAHIUA
900
2100
1200
1500
CANON GRANDE
CERRO DE LA NEBLINA
1800
2100
PICO ZULOAGA
2800
PICO PHELPS
3045
PICO CARDONA
2650
700
200
900
600
N
TEMAUBO
SALTO HUÁ
CANAL DE MATURACA
TUCANO
MANICIBUEI
TITIRICO
RIO CAUABURY
66 W.
CERRO MAYA

this point to the northeast and north in the direction of Pico Phelps in the central part of the mountains. Finally this group returned to the Cauaburi and followed it to the affluent Tucano, pursuing this for a course of about twelve kilometers. It was relatively easy to climb the first chain of mountains, Parabuei, which forms the southern aspect of Cerro de la Neblina. This is an elevated plateau extending to the base of Pico Phelps. The plateau is covered with a low type of vegetation and the terrain is relatively easy to walk. The maximum height reached was approximately twenty-one hundred meters. The actual height of Pico Phelps was estimated as thirty-one hundred meters.

At this point the expedition returned to Cauabury, where both groups joined and continued rapidly to Mañaos and Belém, arriving on May 25.

The End of the Exploration

Mr. Pantchenko and I accompanied by a German entomologist, Mrs. Lindeman, and an American botanist, Dr. Ewell, returned in June, 1964, from Belém de Para by plane to Tapuruquara on the Rio Negro. We continued upstream to the mouth of the Cauabury, as a four-person crew for two aluminum boats. The plan was to return to Venezuela through the Maturaca Channel, Rio Baria, and the Casiquiare—six hundred kilometers across the unpopulated area covered by the jungle. The distance of two hundred and fifty kilometers from the mouth of the Cauabury to the Maturaca, which took us ten days in summer, was covered in two days because all rapids were hidden under the water. We again met the priests and Indians at the Maturaca Mission—the tribe was devastated by flu epidemics.

At Salto Huá we entered Venezuela. Here the character of the country and the river changed. The country was furrowed by thousands of small channels with water running in all directions. We knew that only one of the channels was correct, because it was the one thirty years ago to transport manioc to the Capibara settlement on the Casiquiare. A year ago the way had been reopened by the members of the Boundary Commission; nevertheless, no map existed of the area. We were lost ten days in that region, cutting enormous windfalls which lay across the channels. We loaded and unloaded our boats before obstacles and walked for hours in the river bed, pushing and pulling the boats when the channel was too shallow to use the motors. At the end of the day we cut a space in the jungle and raised our plastic roof; it gave us protection against the rain which fell steadily in that advanced rainy season. At the end of the ten days, the channels started to join until they again formed a single stream, now called Río Baria. We proceeded quickly downstream, entered Río Pacimoni and later the Casiquiare, and on June 22 arrived at Esmeralda. From this mission, which is equipped with radio, we called Caracas, because one of our party had been suffering for the past ten days with repeated attacks of malaria. A plane arrived two days later, and on June 25, after more than five months, we reached Caracas.

1. For the following information I am grateful to Dr. Francisco Durate, Director of the Venezuelan Boundary Commission in Caracas, and to General Ernesto Bandeira Coelho, Chief of the Brazilian Boundary Commission in Belém who allowed me to read the original reports on the expeditions of the Brazilian-Venezuelan Boundary Commission.

2. Braz Dias de Aguiar: Nas fronteras da Venezuela e Guaianas Britanica e Neerlandesa. Rio de Janeiro, 1943.

3. Bassett Maguire: Cerro de la Neblina, Amazonas, Venezuela: A newly discovered sandstone mountain. The Geographical Review, New York, 1955. And Bassett Maguire and John J. Wurdack: La posicion del Cerro de la Neblina, Venezuela. Boletin de la Sociedad Venezolana de Ciencias Naturales, Caracas, 1960.

* The recently concluded work of the Brazilian-Venezuelan joint Boundary Commission has determined, by agreement, that Pico Phelps lies some six hundred meters south of the now established international boundary. Thus Pico Phelps officially, became the point of highest elevation in Brazil.

4. Summer in the sense of reverse terminology of the year's seasons in the tropical countries.

5. Río Baria, originating in the northern slopes of Cerro de la Neblina, divides at a certain point into two streams: Baria itself which runs to west and enters Pacimoni and through it to the Casiquiare. And Maturaca, which curves to the south, enters Cauabury and through it to Río Negro, meeting here the waters of the first stream, which entered Río Negro through the Casiquiare. This anastomosis was known already to Alexander Humboldt, who heard about it from the Indians living on the Casiquiare.

A CHINESE BOTANIST IN AMERICAN GARDENS

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largest specimen of the species that I have ever seen. There are many interesting specimens of *Ilex*: among them, *I. cornuta* f. *rotunda, I. yunnanensis, I. montana,* and *I. pernyi.*

Our visit to the garden of Mrs. John Norman Henry was inspiring as well as enjoyable and instructive. It is a creation of one person who foresees the need of time, and has a purpose to fulfill, a will to succeed, courage to overcome difficulties, patience to reach a goal, and above all a love of Nature and adventure. Mrs. Henry married young and after her children grew up, turned her interests to a garden. In 1926 she and Dr. J. N. Henry, a physician and Director of the Department of Public Health of Philadelphia, purchased ninety-six acres of unimproved land and built a home with a small greenhouse attached. In planting her garden she discovered that many native American species, about which she had read, were unobtainable in botanical collections or any commercial source. In order to acquire these species, she went to the type localities to search for them. Consequently she made over twenty trips to the northern states, sixty trips to the southern states, and eleven trips to the Rocky Mountain region, and became a well-known plant explorer and a discoverer of uncharted mountains in British Columbia. She is a conservationist who does not dig rare plants to enrich her collections—this guiding principle has necessitated repeated visits in order to collect fruits and seeds of certain species. By introduction, breeding, hybridization, selection, and exchange she has accumulated over a thousand species especially in the genera of *Acer, Allium, Aster, Clethra, Halesia, Hamamelis, Hymenocallis, Fraxinus, Kalmia, Ilex, Itea, Lilium, Magnolia, Liatris, Penstemon, Phlox, Quercus, Stewartia, Styrax, Rhododendron, Trillium* and *Viburnum.* She was so willing to show us her collections and to share her knowledge that she walked, and often ran, with us for hours in the garden—in spite of her eighty years of age. She enthusiastically told us about her experiences and proudly explained, "Because I am a great lover of Nature, my place is planted as a wild garden." She prepared many packages of seeds and fruits for us to take back.

(To be continued)

Amaryllis yungacensis.

A SPECTACULAR NEW BOLIVIAN AMARYLLIS

By IRA S. NELSON

Mr. Nelson is Professor of Horticulture, University of Southwestern Louisiana at Lafayette. Mr. Nelson contributed an article on "Some Unusual Amaryllis" to *The Garden Journal,* May-June, 1964, and we believe our readers will be interested in the following, reprinted with permission of the author and the Louisiana Society for Horticultural Research from its Bulletin, Vol. II, No. 4, 1964.

ONE OF THE world's great scenic spectacles is the Yungas of the Bolivian Andes, which is within a day's drive in a northeasterly direction from La Paz. After climbing the bleak and rugged road from La Paz through the pass, one descends rapidly into the balmy atmosphere of the Yungas. The road winds through narrow valleys which, in many places, are more accurately described as gorges.

The rank growth of vegetation covering the mountain sides has attracted plant collectors for years; yet there are probably many undescribed species of plants still to be found in this spectacular setting. This is true partly because of the inaccessibility of the steep slopes and partly because of the wealth of plants which the Yungas supports.

In early November, 1958, Dr. Martin Cárdenas of Cochabamba, Bolivia, accompanied me to the Yungas to collect plants for the Louisiana Society for Horticultural Research. His knowledge of the area, its plants and its climate, greatly facilitated collecting, and his companionship made the trip a very enjoyable one.

As we were returning to Chulumani from Irupana after a successful day of collecting, we caught a passing glimpse of amaryllis foliage on the steep embankment below the bridge over which the highway crossed. Although we felt that this represented a species we had collected earlier in the day, we made collections of the non-flowering bulbs, some of which were kept by Dr. Cárdenas.

The area is one of seasonal heavy rains with adequate moisture in the dry season to support green vegetation. The collection site was a steep, rocky, stream bank at an altitude of 4,560 feet on which silt and organic matter had collected in pockets. The exposure where the bulbs were found was southerly and was partially shaded by overhanging trees.

When the unidentified bulbs bloomed in cultivation at Lafayette, Louisiana, and at Cochabamba, Bolivia, positive identification seemed hopeless because of the inadequacy of the descriptions of several allied species. It was not until Dr. Cárdenas had checked herbaria in Europe and had revisited the type colony of *A. mandonii* in Bolivia that it could be established that we had found an undescribed species. Dr. Cárdenas is most generous to share authorship of this species with me, and I acknowledge freely that his diligent field and herbaria studies led to the final conclusion that we had collected a new species.

Its technical description as *A. yungacensis* Cárdenas and Nelson has been accepted for publication in the Yearbook of the American Amaryllis Society (*Plant Life,* Vol. 21, 1965).

Amaryllis yungacensis is a spectacular species. Its flowers are as large as ordinary American hybrid garden sorts, and its colors and color pattern are bold. There is strong contrast between the large, yellow-green throat and the deep red of the outer one-third of the floral segments. The near white margins of the segments are in striking contrast with its surroundings. The coloration on both sides of the floral parts is very similar. The bold stripe along the midrib is

(Continued on page 213)

CONIFERS WORTH PLANTING

By FRED LAPE

Excerpts from Chapter 7 of *A Garden of Trees and Shrubs*: Practical Hints for Planning and Planting an Arboretum, by Mr. Lape, Director of the George Landis Arboretum. This book is being published by Comstock Publishing Associates, a division of Cornell University Press, Ithaca, New York, September, 1965.

NO ONE can live for a few years in the midst of a large variety of trees and shrubs and not develop likes and dislikes. These are always personal; lists of favorite trees will vary as greatly as the individuals who make them. This fact should always be remembered by anyone choosing trees for his own property. One of the best ways of discovering his own likes is to visit arboretums where he can see a variety of trees growing. Ideally, he should see them in all stages of growth and under all the vagaries of climate—droughts, wet summers, or the aftermaths of hard winters. Many trees which are beautiful when young become sparse and ugly with age. Some trees are prima donnas; they look well only when the weather suits them. Some go on growing beautifully even in adversity. If one can plant only a few trees, it is important to know such things beforehand. A person living at the edge of an arboretum is forced to observe them, and his own list of favorites will develop accordingly.

A walk through almost any arboretum in the United States will draw attention to the preponderance of material from eastern Asia. The flora of the northern two-thirds of both China and Japan are at home in our climate. . . The conifers from China and Japan adapt themselves to our climate as well as do the deciduous trees.

Conifers give stability to any arboretum. They are a year-round attraction, equally beautiful under a blanket of snow or tipped with new growth in May. Even after a severe northern winter has blasted many of the flower buds on deciduous trees, the foliage of the conifers can be depended upon to please visitors. Also, young conifers are often more beautiful than young broad-leaved trees, and with age they grow either stately or picturesque. In the midst of a city or near a heavily industrialized area, growing conifers is something of a problem since they are affected by smog, but even though they rarely attain perfection in such surroundings, many of them endure and are worth their space.

In most sections of the United States the most easily grown and most adaptable of the conifers are the pines. They stand drought better than any other conifers except the junipers and cedars, and they are the last to be browsed by deer. For each climatic range there are species which may be depended upon. In the Northeast, three have proved particularly valuable for reforesting: the native white pine, *Pinus strobus,* and the native red pine, *P. resinosa,* and the Scotch pine, *P. sylvestris,* of Europe. All are fast-growing trees. *P. strobus* is vulnerable to borers and blister rust, and though with age it attains the greatest beauty, of the three it is the one most liable to early death or disfigurement. *P. resinosa,* a beautiful and vigorous tree when young, becomes sparse and scraggy with age. Various forms of the Austrian pine, *P. nigra,* which in youth is similar to *P. resinosa,* are vigorous, hardy, and fast-growing, and excellent for shelter belts.

Of the Oriental pines the most satisfactory here has been the Japanese red pine, *P. densiflora.* It grows rapidly, is hardy, and has masses of rather soft olive-green needles which offer a pleasant variation among other conifers. Since it begins to fruit early, it is desirable for landscape work. For reforesting it is valueless in this section, since it cannot compete with invading native growth. A dwarf, spreading form, *P. densiflora umbraculifera,* known as the Tanyosho pine, produces several stems to form an umbrella shape, which becomes increasingly interesting with age. . . .

Farther south the Japanese black pine, *P. thunbergii,* has been used effectively for seaside planting. . . .

On the other hand, one of the most admired trees in the arboretum is a Japanese white pine, *P. parviflora.* In its native habitat, so I have read, the species is a symmetrical and undistinguished tree; but the form that has been developed in Japanese gardens, which is the one generally found in the United States, has the asymmetry of a fine painting. Its branches shoot off at strange and unpredictable angles

Pinus contorta latifolia, Abies concolor, and a small *Pinus armandii,* in the foreground, at the George Landis Arboretum, Esperance, New York.

and are clothed with tufts of gray-green foliage curled tightly inward. It fruits early and vigorously; the cones ripen in one summer, and drop their seeds early in the fall . .

Another species from China, the lace bark pine, *P. bungeana,* is excellent as a specimen tree. This usually grows into a spreading clump. Its light green bark exfoliates into large, white patches. It has a delicacy and grace possessed by no other pine, and a sunlit specimen leaning over a small brook is a picture. . . .

Still another distinctive pine native to Asia is the Himalayan white pine, *P. griffithii,* with its weeping gray-green needles. . . . The beautiful old Himalayan white pines in Highland Park at Rochester, New York, have the advantage of the moderating influence of Lake Ontario on winter temperatures. In sections as cold as central New York State, the hardier *P. armandii,* a native of China, may be substituted. In appearance it is similar to the Himalayan pine, but the needles are shorter. Foresters in the northeast and the Middle West are now experimenting with crosses between the Himalayan and North American white pines, and may eventually produce a hardy hybrid as beautiful as *P. griffithii.*

Native pines become increasingly prevalent the farther south one goes in the United States, so that any arboretum may find species adaptable to its particular climate. The shortleaf pine, *P. echinata,* and loblolly pine, *P. taeda,* are both beautiful trees in maturity, and the longleaf pine, *P. palustris,* and the slash pine, *P. elliottii,* of the Far South are trees on which any Northerner may look with envy. Even the so-called scrub pines, such as *P. banksiana, P. rigida,* and *P. virginiana,* are not to be despised. With time all of them assume picturesque forms. At the George Landis Arboretum the fastest-growing of its family has been the table mountain pine, *P. pungens,* another scrub; and one of the most beautiful trees at the Bayard Cutting Arboretum on Long Island is an ancient *P. rigida.*

The two western yellow pines, *P. ponderosa* and *P. jeffreyi,* if taken from the eastern part of their range, are hardy in central New York State. They are massive trees with long, heavy needles, quite different in appearance from the native eastern pines, and in a shelter belt they add an interesting variation of texture. The needles of the Jeffrey pine are gray-green and slightly longer than the darker and more solid clusters of the ponderosa pine. Whoever has fallen in love with the tall, cinnamon-red trunks of these yellow pines as they grow in the West must be warned that he will never see them on any tree he plants; the trunks remain dark, almost black, for the first eighty or one hundred years and turn red only in maturity.

Pinus aristata . is not a tall tree, like a redwood, but a high mountain endurer, growing squat and contorted with age like the best Japanese bonsai. In the Northeast it forms a dense, bushy tree with many incurving branches. The dark green needles are always covered with white resin, suggesting a Christmas tree with a permanent sifting of snow. The largest specimen here was brought by truck from Colorado Springs and had its top burned off by summer wind and sun during the trip, but it soon overcame this minor disaster and has grown healthily ever since. One of the most admired plants in this arboretum, it thrives on a dry knoll and withstands drought well . . . Its aristocratic form and slow growth make it valuable for planting in a small yard.

Among the conifers in a northern arboretum, the true aristocrats are the spruces and firs. Like purebred animals, they have fastidious natures. They need moisture, but not too much of it. Hot, dry summers disagree with them; they do best on a well-drained, north-facing slope, A sullen spruce or fir is a dismal sight, but the spire of a healthy specimen rising into the sky, loaded with cones, is one of the happiest pictures an arboretum can offer.

Again, a few of the Oriental species are the most dependable and the most distinctive. For the Northeast there is a group typified by the Nikko fir, *Abies homolepsis,* which rigidly symmetrical, with heavy, stiff, sharply pointed needles, is quite unlike anything native to North America. Others of the group are *A. koreana, A. veitchii, A. firma,* and *A. holophylla.* The Nordmann fir, *A. nordmanniana,* a

Pseudolarix amabilis.

Pinus strobus na

native of the Caucasus and Asia Minor, is another desirable species; its needles are long and wide but softer and more yielding than those of the Nikko fir.

Farther south a relative of the firs, *Cunninghamia lanceolata,* sometimes called the China-fir, is well worth growing. It too has long, wide needles, which taper into a sharp point but are more irregularly placed on the branchlets than those of the firs. It makes a dense growth, olive-green in color and with an unusual texture. The largest specimen I have ever seen is at Easton, Maryland, by the house of the owner of the Eastern Shore Nurseries. Rising just beyond a driveway flanked by an avenue of cryptomerias and deodar cedars, its oddly curved branches contrasting with the textures of the other conifers, it is an impressive sight. Here *Cunninghamia* has been a complete failure. It never gets beyond snowline and eventually dies. I have seen young specimens burned by a severe winter even in Georgia.

The native balsam fir, *A. balsamea,* and its somewhat more pleasing southern relative, *A. fraseri,* are both at home in the Northeast. The southern European species, *A. cephalonica, A. cilicica,* and *A. pinsapo,* are all tender when young, and it is doubtful whether they can succeed in the latitude of central New York State. Slightly to the south, however, they grow well and develop with age into beautiful trees.

Of the spruces, the one longest and most extensively cultivated in the eastern United States is the Norway spruce, *Picea abies,* now represented by many magnificent trees. Although it is a bit dark and funereal, the large cones are decorative, and there is the added attraction that the lower branches are retained even by very old specimens. One on the Honeywell estate in Boston has layered itself all around the edge of its lowest branches and sent up a circle of young spruces, like chickens around an old hen. The Norway spruce flourishes in the North American climate, grows rapidly, and takes on an infinite variety of forms. From its witches' brooms have been developed many valuable dwarf evergreens, such as *P. abies clanbrasiliana* and *P. abies pumila,* whose tight, little mounds are scarcely equaled for certain kinds of landscaping and for large rock gardens.

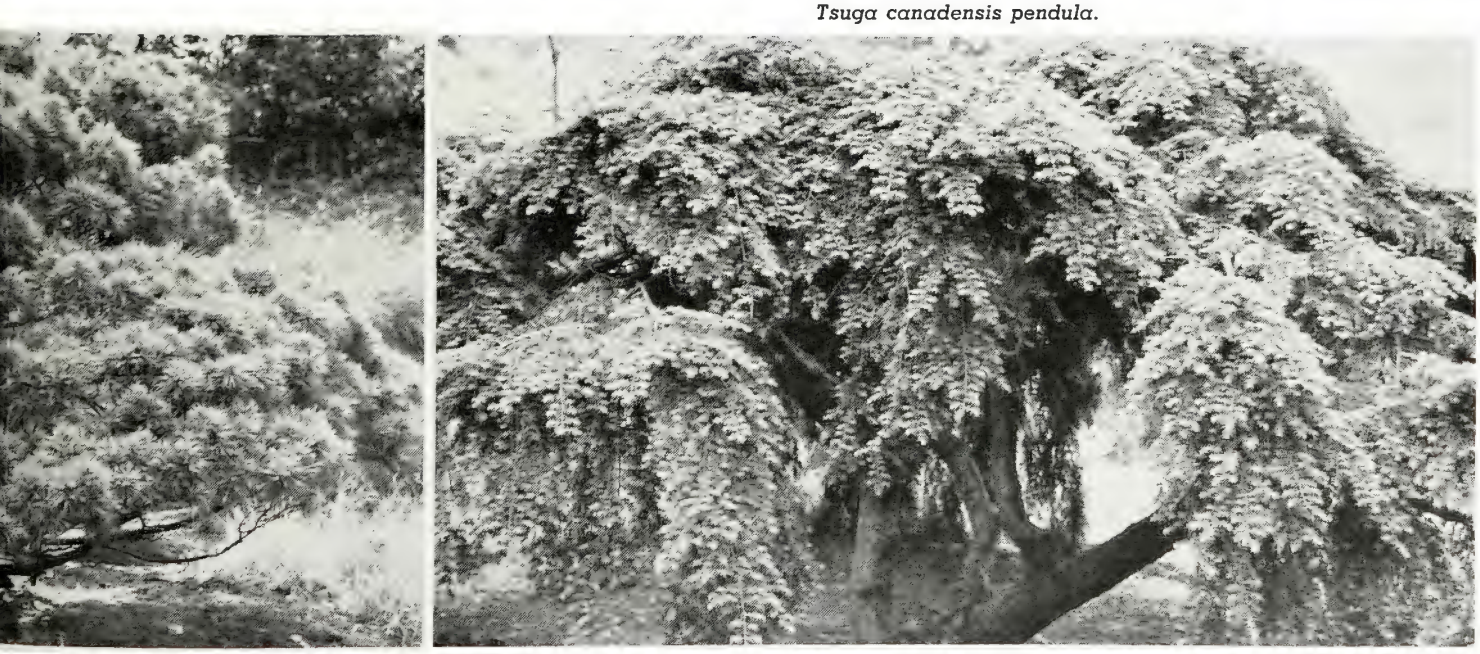
In the early years of this century the Colorado blue spruce, the glaucous form of *P. pungens,* became the status evergreen; even now it remains a stock in trade with eastern nurseries. And no matter how deplorable the overplanting of this spruce or how annoying its tendency to lose its lower branches with age, in the Northeast it remains the fastest-growing and most vigorous spruce, and in its youth the most beautiful.

The white spruce of the northern United States and Canada, *P. glauca,* has been much used for both reforestation and landscape work. It is a tree from farther north, slower growing, and perhaps less distinctive in appearance than the two just described. But its pale blue-green color, in a specimen that is growing well, can be attractive. Of its two distinctive forms, the Black Hills spruce, *P. g. densata,* is a dense, slow-growing tree, and the dwarf Alberta spruce, *P. g. albertiana,* is a formal conical dwarf, suggesting an immaculate juniper more than a spruce.

Very similar in appearance to *P. glauca* is the dragon spruce of China, *P. asperata.* Next to the Colorado blue, this has been the fastest-growing spruce at the George Landis Arboretum, and I therefore recommend it especially for planting in shelter belts, to add variety of texture and color. In color it ranges from gray-green to blue-green. Its shape in youth is irregularly conical and not particularly distinguished.

The Engelmann spruce, *P. engelmannii,* from Colorado, and the Yeddo spruce, *P. jezoensis,* from Japan, are both hardy in the Northeast and similar in appearance. In both the needles are finer than those of any of the spruces previously mentioned, and in color they range between a somber green and blue-green. The Serbian spruce, *P. omorika,* is a much better-looking tree, combining the color of a Colorado blue with a more loose and graceful manner of growth. If it were not so difficult to transplant, it would probably be one of the most popular spruces on the market. The Alcock spruce, *P. bicolor,* from Japan, is similar but

Tsuga canadensis pendula.



Pinus rigida.

has finer needles and a slightly denser silhouette, enhanced by a glittering contrast between the upper and lower surfaces of the needles. It is a desirable and easily grown spruce which deserves more attention than it now receives.

The pines are strong, bold trees, the spruces and firs ideally symmetrical. For softness, grace, and delicacy nothing equals the larch, nor is there anything to compare with the fresh green of its first spring foliage . . The eastern tamarack, *Larix laricina,* a beautiful sight in northern swamps, tends to appear somewhat thin in cultivation. Young specimens of the Japanese larch, *L. leptolepis,* have longer needles and denser foliage, and the little cerise-colored female flowers in April are one of the joys of the year. But after twenty years or so its vigor declines, and it is outstripped by the European larch, *L. decidua,* which with maturity becomes an imposing tree. The Dominion Arboretum in Ottawa has some fine specimens of a distinctive species, *L. sibirica,* and seedlings of it are doing well here.

A relative of these *Pseudolarix amabilis,* differs from the true larches in having wider, softer needles, clustered like little umbrellas. To look down at a growing branch is a revelation in plant form; no other conifer shows quite such perfection. In autumn it turns an even brighter gold than the true larches; for a few days each year those here are the showpieces of the arboretum. In this climate the older trees appear not to become scraggy with age, like the true larches, but rather more spreading and monumental, their lower branches twisting like those of a white oak.

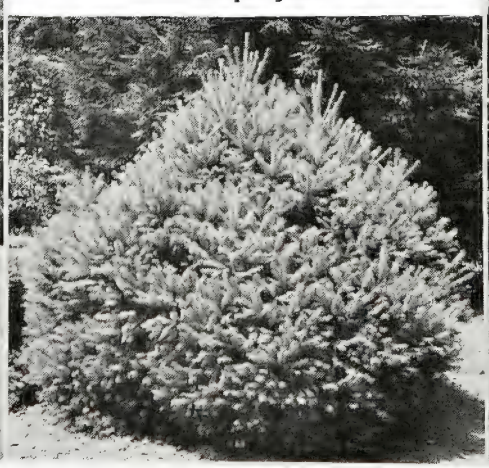
Another evergreen with its foliage arranged in little umbrellas is the Japanese umbrella pine, *Sciadopytis verticillalta.* The long, thick, glossy needles are soft to the touch, and circular, umbrella-shaped clusters give the tree an appearance which is unique among all conifers . . .

The junipers are also less vulnerable to drought than most conifers, and most are easy to cultivate. Great variations occur within the species, from sprawling ground cover to sentinel column. In a small arboretum their uses are manifold. For rock garden work there are the ground-cover forms of *Juniperus chinensis, J. communis, J. horizontalis,* the Japanese *J. procumbens,* and, for more southerly latitudes, *J. conferta.* For vertical accents *J. communis suecica,* the Swedish juniper, and *J. communis hibernica,* the Irish juniper, are exceptionally thin and upright; less rigidly columnar specimens may be chosen from *J. virginiana* or *J. scopulorum.* A variant, the needle juniper, *J. rigida,* has long, thin leaves almost as sharp as the thorns of a cactus. In old age all the junipers have picturesque forms and beautiful trunks, but they grow so slowly that a man who plants a young juniper has little hope of seeing it at that stage. Within each of the species there is so much variation that it is all but impossible to predict what shape a young tree will finally take. Even the foliage may change with age; it may consist either of scales or needles or of both at once, and in color may range from bright green to ash-blue. Most junipers are dioecious, moreover, and the male and female plants may take quite different shapes. Because of their widespread use in landscaping, they are more generally available than any other conifer. If a plant is wanted for a certain spot, the wisest procedure is to go to a nursery and pick out the one that appears most suitable. The native North American juniper, *J. virginiana,* always takes the form of a tree, but its range of shape and color is enormous. Unfortunately, it is one of the plants commonly browsed by deer, and its use where they are numerous is not advisable.

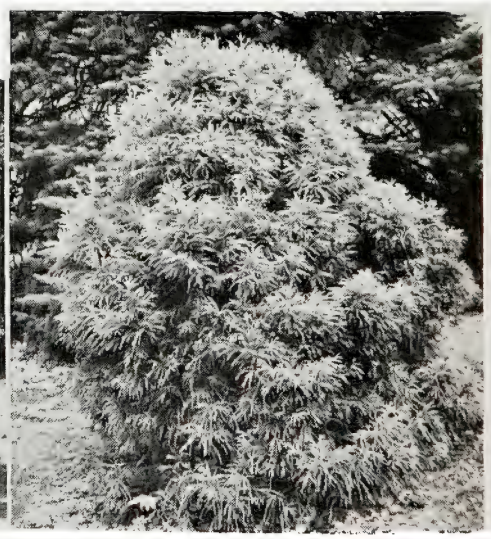
At the George Landis Arboretum the most unusual-looking juniper is a specimen of *J. squamata* with a central dome of foliage perhaps two feet high and of the same diameter, from which long streamers of growth sprawl out

Sciadopytis verticillata.

Picea pungens.



Cryptomeria japonica.



Left, *Abies firma.*
Right, *Abies veitchii.*

flat over the ground, looking like a gigantic octopus.

. . . the genus *Chamaecyparis* includes some of the loveliest of evergreens, and most of them are fairly hardy. ... Two remarkable species native to Japan, *C. obtusa* and *C. pisifera,* offer a tremendous variety in both size and foliage. My own favorites are the species form of *C. obtusa,* and of the other species the plumed form, *C. pisifera plumosa,* and the exceedingly distinctive *C. p. squarrosa,* sometimes called the moss cypress because its foliage resembles a bed of moss. It tends, however, to winterburn on the south side in severe climates and thus should be planted on a north slope, if possible, so that the north side of the tree will be the one usually seen. Probably no other species of conifers have yielded more dwarf forms than these two. Some are slightly tender when young, but all are interesting and valuable for the rock garden. The aristocrat of them all is *C. obtusa nana.* To my mind no dwarf evergreen can compete with a fifty-year-old specimen, head-high, with dense, perfectly formed curves of overlapping foliage.

The resemblance between a chamaecyparis and an arborvitae *(Thuja)* is so close as to baffle an amateur. The common test is to look at the undersides of the leaves; those of a chamaecyparis show whitish marks, giving them a silvery appearance, whereas the leaves of an arborvitae are generally green on both sides. But the rule is not absolutely reliable for either species. For landscaping and reforestation the two genera have the same values; both have soft, fine-textured foliage, and in youth both have an irregularly conical shape which becomes stately with age; in both the trunk is covered with fine curling bark which varies in color from gray to cinnamon-red but is always attractive. The arborvitaes tend to be the more aromatic of the two.

In the United States east of the Rockies the various forms of *Thuja occidentalis,* the native American arborvitae, have probably been used in landscaping even more than the junipers. In shape they may be anything from small globes to the thinnest of columns, and their many variations of foliage include some which are golden or white. The worst defect of the arborvitaes is that in winter their color turns sallow; there has been some effort to develop varieties which will remain vigorously green through the winter. Another fault is that the foliage tends to become rather sparse with age....

A Japanese species, *T. standishii,* is quite different in

Pinus densiflora at The New York Botanical Garden.

foliage and habit of growth from other arborvitaes and, being hardy, deserves a place in any collection. A species native in China and Korea, *T. orientalis,* takes many forms which are like those of the American arborvitae except in having finer leaves. These forms are offered in the nursery trade. They are not successfully hardy north of Long Island, however; specimens grown above this limit are likely to look decrepit from winter damage.

For the middle latitudes of the United States, *Cryptomeria japonica,* a stately native of the forests of Japan, offers a shape and foliage unlike those of any other conifer, and is a most desirable tree at any age. It is perhaps most beautiful in midwinter, when parts of the foliage turn almost cinnamon-red...

The bald cypress of the southern United States, *Taxodium distichum,* will survive in the North and in time will

Left, *Metasequoia glyptostroboides.*
Right, *Picea omorika.*

even develop the characteristic knees. Highland Park in Rochester, New York, has some fine old specimens. Apparently because in a severe northern winter the tips of the branches are destroyed, it develops a densely pyramidal form rather than the broad, spreading crown of the southern tree. And like all tender trees when moved to a harsher climate, it seems to do better in a drier situation than that of its native habitat.

The recently discovered dawn redwood, *Metasequoia glyptostroboides,* offers for the North a hardier and more vigorous substitute for the bald cypress, which it resembles. It is not, however, a swamp tree. With its verdant foliage and red bark, it is a welcome addition to our conifers. Its only defect is a tendency to rapid growth and therefore to a thin and open structure.

The yews *(Taxus)* have been sufficiently exploited by nurseries to be familiar to nearly everyone. The dark green of their foliage is unique among conifers, and the density of some forms, as well as the red fruits, are further attractions....

Among conifers my own favorites are the hemlocks *(Tsuga),* but they can be exasperatingly difficult under cultivation. The native North American species, *T. canadensis,* will seed itself thickly and spread with ease from the north side of a woodlot, and always look beautiful; transplanted to the garden, it may winterburn. Few sights are more beautiful than that of an old hemlock hedge, but to get one started means headaches as well as waiting. Once established, a hemlock will thrive, provided it is not too much exposed to bright winter sun. . . The weeping form *T. c. pendula,* also known as Sargent's hemlock, is a fine tree whose habit of very slow growth makes it an excellent choice for a yard. It should be bought balled and burlapped, transplanted carefully, and kept mulched for a couple of years. All this effort will be repaid. It should be remembered, however, that when after many years it reaches a height of ten feet, it will have an equal spread and thus must be given room, not used as a dwarf beside the walk. The southern hemlock, *T. caroliniana,* a smaller tree with broader needles than *T. canadensis,* also seems easier to handle, but although it is attractive, it does not have quite the same lacy effect. Two species from Japan, *T. sieboldii* and *T. diversifolia,* have still wider and stubbier needles and a very different texture, at once dense and frothy. Both are quite hardy....

The related Douglas-fir, *Pseudotsuga taxifolia,* if taken from the eastern edge of its range in the Rockies, is perfectly hardy and makes an excellent addition to a shelter belt. Its foliage shows a wide variation in color, from sallow green to gray-blue. It does not fruit early, but the odd cones, with three tiny prongs at the tip of each scale, are worth waiting for. It is a forest tree and requires space.

CLASSIC TREES (Continued from page 189)

mollis #1, *mollis* #2, 'Lavalle', *pinnatifida major,* and *oxyacantha punicea.*

Let us do away with the mundane use of trees. This is not to imply that every street, every home, and every public building should be planted with formal trees or in the classic manner. Not at all. Some years ago I coined a little phrase, or better yet proclaimed a philosophy pertaining to trees wherever they might be used, "Fit the tree to the available space." Not an earth-shaking edict; but whenever the point is brought up that I seldom mention big trees, I can point to this slogan.

Europe was plagued with a plethora of fast, easy-growing, monster-size elms, but a prominent horticulturist there told me some years ago, "Thanks to the Dutch elm disease we were able to remove these forest trees from our streets and begin to make sense in our plantings." They have.

We have Dutch elm disease, but what happens? Do we learn from the experiences of others? No. In our supposedly, but very silly, great ability to build Rome in a day (actually, though, our cities do look as if they had been built in a day), we continue planting big, fast-growing species. Not silver maples and American elms, but other species of equally dubious repute. Instead of learning from past mistakes, we have to do it the hard way—and all the time our cities become uglier and uglier.

However, there is a small band of dedicated municipal arborists switching to sensible trees for their city streets. In the past ten years a number of classic trees have been made available, and they are slowly making an imprint in the planting of American cities. When most professionals catch up to the general public, who love streets of classic trees, then and only then shall we be on the road to common sense and beauty in the use of trees.

CONTROLLING INSECT PESTS (Continued from page 195)

One chemical is not recommended for all insects and all plants are usually not infested. Unnecessary spraying increases the cost of maintenance, and also the hazard to the applicator and desirable animals which may be in the vicinity. Pesticides should not be applied unless needed.

When sprays are applied to a wide variety of plant materials under varied conditions, plant injury is always a hazard. Two plant sensitivities are worthy of particular attention at this time. Cannaert junipers are browned by applications of malathion, and DDT sprays defoliate Amur River privet. A compilation of known phytotoxicities was published in Purdue Mimeo E-41, which is listed at the end of this article.

Persons interested in further study of insect pests of ornamental plants may like a list of references. The four references listed here furnish the basic information needed to identify the pests of ornamental plants:

English, L. L. Illinois Trees Shrubs: Their Insect Enemies. Illinois Natural History Survey, Circular 47. 1956. 25 cents. Illinois Natural History Survey, Natural Resources Building, Urbana, Illinois.

Pirone, P. P., B. O. Dodge, and H. W. Rickett. Diseases and Pests of Ornamental Plants. 1960. Ronald Press Company, New York.

Schuder, D. L. Insect Pests of Trees and Shrubs. Purdue University Mimeo E-41. 1962. Agricultural Experiment Station, Lafayette, Indiana.

Westcott, Cynthia. The Gardener's Bug Book. 1964. Doubleday and Company, Inc. Garden City, N. Y.

PLANT LORE OF A MIDSUMMER-NIGHT'S DREAM

By Dora A. Hicks

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PART II

Thyme is a small plant belonging to the genus *Thymus;* it is used in cooking as seasoning. Thyme belongs to the Mint Family. Shakespeare cultivated thyme in his own garden, but it grew profusely in meadows, as Oberon says (II, i, 250):

"I know a bank where the wild thyme blows."

Knotgrass is the common name given to a small weed, *Polygonum aviculare,* which inhabits the whole earth. It is wiry and multi-branched. The flowers of the so-called grass are light pink. It is not a grass—the name was given through carelessness. Lysander applies this name to Hermia (III, ii, 327-28):

"Get you gone, you dwarf;
You minimus, of hindering knot-grass made;"

because she is so small. The small flowers of the herb are supposed to stunt growth.

Puck likens himself to a crab-apple to tease the gossip when she is drinking. He is the Robin Goodfellow, without whom *A Midsummer-Night's Dream* would be seriously lacking. A crab-apple is suggestive of the pranks this Robin Goodfellow might do. The crab-apple was sometimes used in drinks as cherries are now used.

When Puck and Oberon begin straightening out their misdoings of the night, they make use of the juice of Dian's bud, which has more charm than does love-in-idleness. It is stronger, in that it can remove the magic caused by Cupid's-flower. The nearest we can come to the identity of Dian's bud is *Vitex agnus castus,* commonly called the *"chaste-tree."* Old English faith holds that the "chaste-tree" had virtues on Palm Sunday when used as a substitute for palm. On that day, its branches became valuable for healing and for the aversion of spells. Long ago it had a purifying agency. In the festivals of Ceres, *Vitex agnus castus* yielded beds for maids, where they might sleep and retain their innocence. Puck says of it (III, ii, 448-457):

"On the ground
Sleep sound:
I'll apply
To your eye,
Gentle lover, remedy.
When thou wakest,
Thou takest
True delight
In the sight
Of thy former lady's eye:"

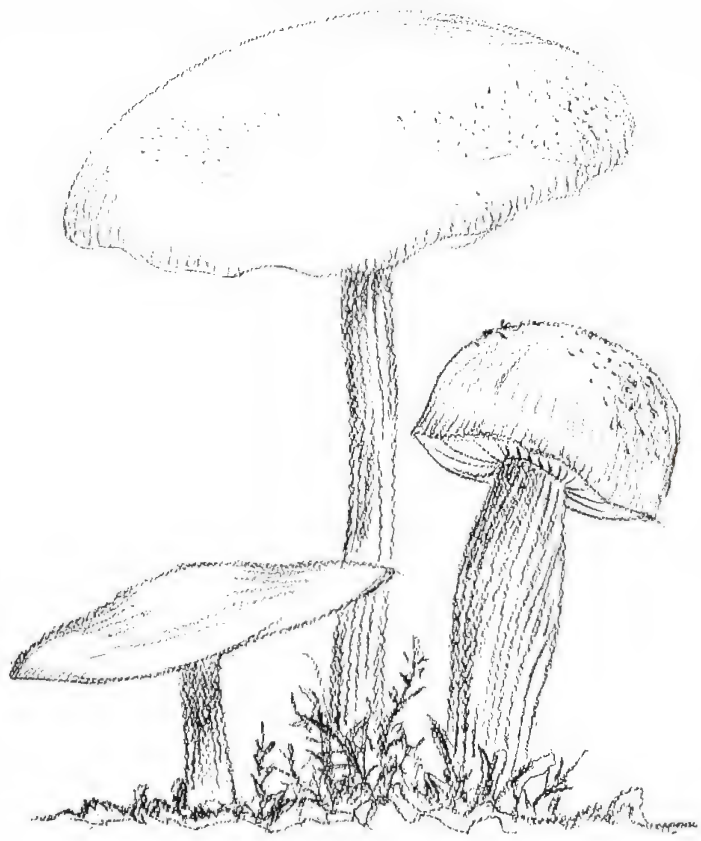
Oberon applied the juice of this flower to Titania to remedy her state. He says of it (IV, i, 74-77):

"Be as thou wast wont to be;
See as thou was wont to see:
Dian's bud o'er Cupid's flower
Hath such force and blessed power."

The remedies work, all are restored to their normal states, and the play ends happily.

To me, the most interesting allusion to plant lore in *A Midsummer-Night's Dream* is that of the fungi. Titania and Oberon, as rulers of the "wee world," carry our imagination with them into all their haunts. When we imagine all these little people gathered together in Shakespeare's atmosphere of spring beauty, manifested in the vast array of the plant world, we are presented with a beautiful spectacle. The fungi, when first observed, were such a mystery to the observers that it is not surprising the only account they could give of them was through the supernatural. Many references are founded upon the belief that toadstools and similar fungi were definitely connected with fairies. A very old tradition tells that after the wee people had gathered together on a midsummer evening, they joined hands and danced together in a ring. Their tracks were fairy-rings in the meadows, and the toadstools grow-

Collybia maculata.



ing in them served as seats for the tired elves. The casual observer has often wondered at the regularity of outline of these rings, and it is not surprising that ancient folklore is associated with them. The old west-country superstition was very popular. It held that if a maiden wished to improve her complexion, all she had to do was to go out early on a May morning and bathe her face in the dew from the grass. She must be careful, however, to avoid the grass that was growing within the circles, for the fairies might revenge themselves on the intruder by ruining her complexion. It was popularly believed that one might suffer unfortunate results should she even step inside the rings. Another legend expresses the belief that the rings were formed by the fairies riding the colts of the fields round and round.

Late in the sixteenth century search was started on the origins of the fungi. The hypothesis reached was as erroneous as the fairy supposition—that the rings were caused by thunderbolts. The diameter of the ring represented that of the bolt, the lightning burning the grass around its edge. The true cause of these rings lies in the development of the spawn or mycelium of the fungus. The mycelium arises from a spore. When the spore germinates, it throws minute germ-tubes which elongate and branch into filaments termed hyphae. These hyphae ramify until a mycelium is formed, which grows larger and larger in the form of a rosette. The rosette thus becomes a ring of mycelium whose outer filaments continually push forward to fresh nutriment ground, while the inner filaments die of starvation. The mycelium remains near the surface of the soil since it must have oxygen for growth. The chemical and physical changes produced cause a bare ring on the surface near the growing mycelium. This bare ring is the fairy ring of mythology. One of the most common fungi to produce these rings is *Collybia maculata.* The little fairies of *A Midsummer-Night's Dream* call the fairy rings orbs (II, i, 8-9):

"And I serve the fairy queen,
To dew her orbs upon the green."

Titania suggests a few places where she and her train are wont to meet and dance their rings (II, i, 83-86):

"Met we on hill, in dale, forest or mead,
By paved fountain or by rushy brook,
Or in the beached margent of the sea,
To dance our ringlets to the whistling wind,"

As the study of fairy rings concludes plant lore in *A Midsummer Night's Dream,* it leaves to the individual a more thorough understanding of Shakespeare, a deeper appreciation of his play, and a much broader knowledge of the British plant world in which he lived and with which he was so closely associated.

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A WINDOW INTO THE PAST

By HERMAN F. BECKER

Dr. Becker is Curator of Paleobotany at The New York Botanical Garden.

Columbus O. March 11th 87.

Prof. Lester F. Ward. Washington.

My dear Sir.

When I wrote to Prof. Agassiz some time ago, asking the reason why he did not send Mr. Sternberg for collecting in Kansas, the Cambridge museum sent a carte informing me of the absence of Mr. Agassiz. Today I have his answer. He says that he is not for the present disposed to make expenses for paleobotanical collections and that to pay a collector appeared to him far more expensive than the purchase of collections already made, especially on account of the mass of rubish which is sent ever by the best collectors. That was, he says, the only reason.—With what we have seen now of the plants of Kansas, I do not think that a collector could now procure many specimens of new or interesting species.

Very truly your's
Leo Lesquereux

Together with a biography of Asa Gray by A. Hunter Dupree, 1959, the original letter was given to me by the late Dr. Roland W. Brown, Paleobotanist of the United States Geological Survey in Washington. Brown, an ardent student of botanical history and philology, is well known for his most excellent *Composition of Scientific Words* (1954). His keen interest in the work, the opinions, and philosophy of other scientists is shown by numerous annotations and corrections on the pages of *Asa Gray.*

The letter from Leo Lesquereux to Lester F. Ward gives us a minute glimpse into the history of botany, a mild flash which allows us to read between the lines. This letter is historically interesting, since it involves not only two paleobotanists, Lesquereux and Ward, and a known fossil collector, Sternberg, but also the famous zoologist and glacial geologist, Louis Agassiz.

Columbus O. March 11th 87

Prof Lester F. Ward Washington.

My dear Sir

When I wrote to Prof Agassiz some time ago, asking the reason why he did not send Mr Sternberg for collecting in Kansas, the Cambridge Museum sent a card informing me of the absence of Mr Agassiz. To day I have his answer. He says that he is not for the present disposed to make expenses for paleontological collections and that to pay a collector appeared to him far more expensive than the purchase of collections already made especially on account of the mass of rubish which is sent even with by the best collectors. That was, he says, the only reason — With what we have seen now of the plants of Kansas, I do not think that a collector could now procure many specimens of new or interesting species —

Very truly yours

Leo Lesquereux

Ward, in his *Sketch of Paleobotany* (1883) states that Lesquereux, Agassiz, and Guyot were of a little band who left Europe because of political turmoil. Leo Lesquereux studied the coal formations of the eastern and midwestern United States and became the foremost authority in the nineteenth century on fossil plants of the Paleozoic and Mesozoic eras. Lester F. Ward, a paleobotanist in his own right, endeavored to accumulate fossil collections through purchase, exchange, or agents in the field. Scientists and professional collectors alike in botany and paleobotany were well known to each other, procuring living and fossil plants which were sold or otherwise distributed. The present letter highlights such a collector-purchaser relationship which, incidentally, involves Louis Agassiz.

A penciled annotation by Brown in the book *Asa Gray* conveys the feeling of Asa Gray toward Agassiz, both members of the staff at Harvard University. Brown's annotation is a partial quotation of a letter from Gray to Sir Joseph D. Hooker, dated May 11, 1863: ". . . this man (Louis Agassiz), who might have been so useful to science and promised so much here, has been for years a delusion, a snare, and a humbug, and is doing us far more harm than he can ever do us good." Today, this statement by Gray sounds rather amusing, but scientists then as now were wont to be critical and supersensitive about each other. Gray's opinions of Agassiz mellowed considerably in later years. Their chief differences stemmed from diametrically opposed views on evolution. Gray, as a personal friend and protagonist of Darwin, was held in great esteem by the evolutionist, even though he did not agree on all points with Darwin's philosophy. Agassiz, by contrast, remained stubbornly opposed to Darwin's ideas.

At any rate, according to the letter—this minute window into the past—Leo Lesquereux was unable to secure funds for Ward's and Sternberg's enterprise in Kansas, since Agassiz "was not at the present disposed to make expenses for paleobotanical collecting."

NEW BOLIVIAN AMARYLLIS (Continued from page 204)

present only on the inner surface of the segments.

The scapes bear two moderately short-tubed flowers which are well poised on the flower stem. In cultivation the foliage tends to dry up during the late summer and resume growth again in the fall.

Amaryllis yungacensis appears to be easy to handle in cultivation and should be a fine addition to our pot and garden flowers. Its value as breeding stock is yet unknown, but it has several desirable characteristics.

In cultivation it has not yet been possible to obtain a seed set after self pollination, but seed was readily obtained by using two different clones of *A. yungacensis.*

The consciousness of civic beauty and the necessity for developing and preserving it is a state of mind that can be attained only with age . . . People of a new country and a new town are too busy developing the necessities of civic life to have time for the gentler amenities. Sewers invariably come before flowers and street lights must be erected before they can be garlanded with blossoming boxes.

There are always those who bemoan the fact that city fathers didn't think of parks and playgrounds before they founded the city. Well, some of them did. William Penn planned parks for Philadelphia and Oglethorpe for Charleston. Today the architectural monstrosity of the City Hall covers a park-area Penn had dreamed of. Had the descendants of Penn followed his plans, Philadelphia would be dotted with parks. The trouble lies not in the lack of vision of the founders. It is the third and fourth generations that put aside the vision as silly and old-fashioned. They claim it obstructs progress.

This fetish of "progress" has cost the people an incalculable sum in beauty and health . Then when "progress" has spent itself, it suddenly dawns on people that something ought to be done about the wholesale destruction of beauty . . .

Nor can we altogether cure these conditions, because they are the natural course of civic expansion. Not until a town attains a certain age does it become acutely aware of the value of beauty.

Richardson Wright in *The Gardener's Day Book,* 1938.

STINKHORN FUNGI

By Clark T. Rogerson

Dr. Rogerson is Curator of Cryptogamic Botany at The New York Botanical Garden.

Pseudocolus schellenbergiae. Eggs about one inch in diameter, smooth, pinkish to brown. Expanded fruit-body up to three inches tall, consisting of a cup (remains of egg); a short, hollow, pinkish or whitish stalk (sometimes absent) with three or four cylindric arms, white below, orange-colored above, which arch outward and are united at apex; dark green slime mass of spores borne on inner surfaces of arms. *P. schellenbergiae* occurs in gardens, wood-chip mulch, around rotten stumps, and is known from Pennsylvania, Ohio, New Jersey, New York, Connecticut, Rhode Island, Massachusetts.

AMONG THE MOST BIZARRE MEMBERS of the fungi are those commonly known as stinkhorns, which are related to puff balls. After rains in summer or fall they burst forth, often appearing overnight, from "eggs" buried in the humus, duff, or mulch. Growth of the fruiting-bodies is rapid, sometimes distinctly perceptible. Lawns and gardens are favorite habitats for some species; others prefer moist woodlands or forests where decaying leaves and wood abound. About twenty years ago one species, *Pseudocolus schellenbergiae*, was found at The New York Botanical Garden under a grape arbor. It was seen only a few times subsequently until 1960 when the Garden started to use wood chips as a mulch under shrubs. Quickly adapting to wood chips as a source of food, *P. schellenbergiae* can now be found wherever chips have been placed. Stinkhorn fungi do not parasitize other plants, but obtain their food from dead plants and contribute to the cycle of decay.

A distinctive characteristic of these fungi is the odor, described variously as "foul," like "rotting fish," "sickening sweet," "foetid," "faecal," "vile," and so on. In some species the shape of the fruit-body is that of a cow's horn, curved and tapered to a point. English-speaking peoples have stressed these characteristics, hence the name stinkhorn.

The fruit-bodies are unusually colorful—pink, rose, lilac, orange, scarlet, red, and all intermediate shades, and white are common. Some have delicate, lacelike netting; some are honey-combed in distinctive artistic patterns; some have brightly colored flaring arms and other processes. It is not surprising that the Germanic-speaking people prefer to call these fungi *Pilzblumen*, "fungus flowers." They are truly as fantastic as some flowers in color and shape.

Reproduction is by means of microscopic, one-celled spores, which are produced on club-shaped cells in a fruit-body. The spores germinate to produce threads which, spreading out through a substrate, obtain food from decaying plant material. Eventually rootlike strands are produced, called rhizomorphs. The terminal ends of these strands enlarge to form egglike structures just beneath or at the surface of the soil. At maturity the interior central column of the egg elongates and bursts through the upper skin of the egg, carrying with it a slimy mass which contains spores. This is the fruit-body; in many stinkhorns it consists of the elongated stalk, bearing a cap at the apex. The slimy mass of spores, which is the odoriferous portion, may be on the upper portion of the stalk as in *Mutinus*, on

Phallus ravenelii. Eggs ovate, two to three inches in diameter, whitish, pinkish, or pinkish lilac. Expanded fruit-body six to eight inches high, consisting of a cup, a cylindrical, honeycombed, hollow, yellowish white stalk, a cap with smooth surface covered by an olive-gray slime mass and a raised white disc at apex perforated in the center. *P. ravenelii*, found in the fall in groups around or on very rotten stumps and logs, is known throughout the eastern United States.

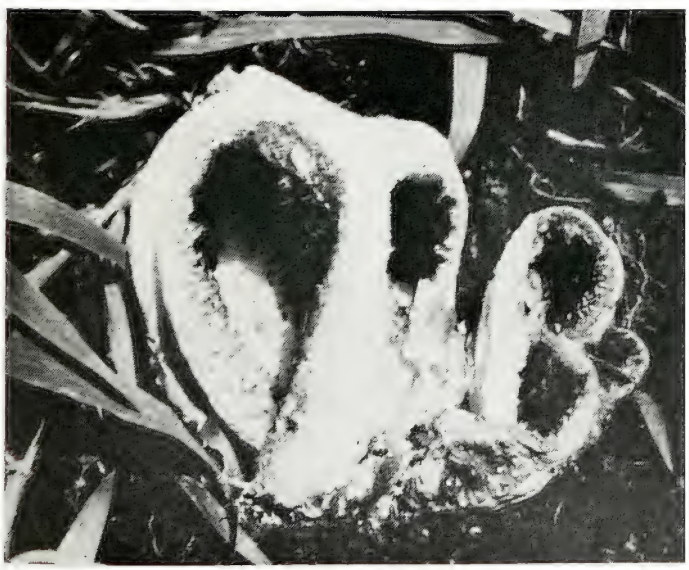
Mutinus elegans. Eggs ovoid, about one and a half inches in diameter, white with pinkish tinge; expanded fruit-body eight to ten inches high, consisting of fleshy-gelatinous cup at base (remains of egg), an elongated hollow, spongy stalk tapering gradually upward to a blunt, perforated apex, pinkish red above, whitish downward, upper part of stalk covered by olive-brown slime mass. *M. elegans*, occurring on rich soil or mulch in gardens and lawns or in humus in woods and around stumps, is known throughout the United States.

Dictyophora duplicata. Eggs globular, two to three inches in diameter, white or tinged flesh color. Expanded fruit-body six to eight inches tall, consisting of a fleshy-gelatinous cup (remains of egg), an elongated stalk, a cap, and a netlike membrane attached under the cap to the stalk; cap with honeycomb-like ridges covered by a greenish olive slime mass; membrane hanging below cap lacelike, white to pinkish; stalk white, chambered and hollow. Occurring singly or in groups in woods, often around stumps. *D. duplicata* is known throughout the United States.

the upper surface of a caplike structure as in *Phallus* and *Dictyophora,* on arms which are free as in *Lysurus* or united at the tips as in *Pseudocolus,* or a stalk may be absent as in *Clathrus.*

The fruit-bodies are specialized for the production and dissemination of the spores. Flies and other insects and animals are attracted by the stench of the slimy spore mass; spores stick to their bodies and thus effective dispersal of the spores is assured.

Clathrus columnatus. Eggs subspherical, one to one and a half inches in diameter. Expanded plant four to six inches high, consisting of two to five spongy, curved, delicate rosy red columns with separate, pointed basal ends which remain in the cup and with distal ends incurved and fused into a flat roof from which hangs the brown slime mass. Occurring in humus of woods and forest, *C. columnatus* is known from the southeastern United States.



Phallus rubicundus. Eggs one to three inches in diameter, white. Expanded fruit-body six to ten inches tall, consisting of a cup, a cylindric stalk tapering upward which is hollow, scarlet, and honeycombed, and with a bell-shaped cap covered by a yellow-brown slime mass, scarlet underneath and with a perforated apex. *P. rubicundus,* found in lawns and open grassy places, is known primarily in southern and midwestern United States.

Stinkhorn fungi are more common and reach greatest diversity in the tropics. Only ten species are known from the northeastern United States.

Most books list stinkhorn fungi as unpalatable. There are records, however, indicating that the "eggs" of species of *Mutinus* and *Phallus* are very good to eat when fried properly.

Lysurus gardneri. Eggs globose, one to one and a half inches in diameter, white. Expanded plant four to six inches high, consisting of a cup, a club-shaped, white, spongy stalk bearing at the apex six erect, narrow, hollow arms, incurved above, with pale flesh-colored backs which are traversed their entire length by a shallow furrow and with an olive-green slime mass covering the inner surfaces. *L. gardneri* occurs in gardens and is known from New Jersey, New York, and Pennsylvania. It is reported to have been introduced from the tropics.

MORE OF RICKETT'S TRAVELS

Plants reproduced from colored negatives taken by Dr. Harold W. Rickett, Senior Curator of Botany at The New York Botanical Garden.

Above, beehives in Cades Cove.

At right, The Mitchell Place in Cades Cove. The original house is behind; the larger in front was built for Mitchell's bride.

In my continuing endeavors to become more familiar with the southeastern flora, I set out on June 15, 1965, for the Southern Appalachians. First to Knoxville and the University of Tennessee, in my perpetual quest for assistance. In the absence of Dr. Sharp, I had good conversations with Dr. Hesler and Dr. Clebsch and with Harold Hoffman.

Then to Gatlinburg—that horrible enfilade of filling stations, souvenir shops, motels, and restaurants—and Great Smoky Mountains National Park. There I was kindly received by Park Rangers Henry Lix and Tom Savage. (The former was in one of the first classes I taught at the University of Missouri in the 1930's.) I camped four nights in the Park. Climbed Gregory Bald (4,948 feet) and was rewarded by the incredible display of flame azaleas, *Rhododendron calendulaceum,* for which it is famous. They are of all colors from scarlet to yellow (a bit gaudy for my taste, but there on the mountain I can take it. There were also a few bushes, with white and pink flowers, of *R. arborescens.*) The one discouraging feature—wild pigs, brought into the mountains years ago for the pleasure of hunting them, are rooting up everything in sight. They may also be dangerous, though the two I encountered made off hastily with appropriate snorts. I spent the night, with three other people and a bear, in the shelter near the summit.

The following day I climbed Mt. LeConte (6,593 feet) and was gratified by *Geum radiatum* hanging to the face of the topmost cliff. Also by superb views and by masses of *Rhododendron minus* and sand myrtle, *Leiophyllum buxifolium;* these constitute most of the "heath bald" on the summit. On the trail I walked through a forest of *R. catawbiense;* in many places the petals had fallen and carpeted the path with pink and lavender. There are also fascinating herbaceous plants—*Galax* and tiny white violets, *Oxalis montana* carpeting the ground, *Astilbe, Cimicifuga,* and many others. I went down the same day, having foolishly neglected to make reservation at the Lodge (an attractive group of rustic cabins). The fifteen-mile hike proved a bit tiring.

Coming down these mountain trails one meets dozens of tourists on the way up. Many, of course, never reach the top and are chiefly notable for the inadequacy of their footwear and the adequacy of their complaints. The camp ground is remarkable for the elaborate equipment of these people—enormous tents and trailers, tables, chairs. They spend much of their time with domestic chores; in the afternoon they generally drive into Gatlinburg. Mr. Lix told me they may have eight thousand visitors a day in the "visitors center," the lobby and exhibit area so crowded that

Left, the trail up LeConte passes a cliff-face, over which hangs *Rhododendron catawbiense.* Center, the slope of LeConte; *Rhododendron minus.* Right, the trail to Gregory Bald crosses a stream which flows through thickets of *Rhododendron maximum.*

one cannot get through; many of the tourists seem not to know where they are or why. Sometimes they strike a spell of rain, and some then decide they have had enough camping for the rest of their lives and take off, abandoning all that expensive equipment!

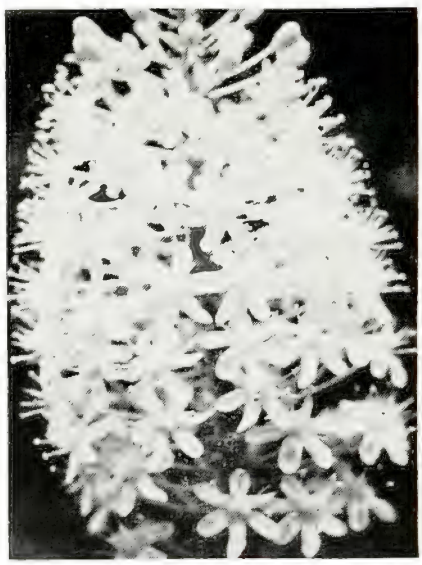
As everywhere, the Park Service does a beautiful job of arrangement and maintenance. I have only one criticism. Bears make the round of the camps every night, scattering the garbage over the landscape. It is illegal to feed the bears—yet in this the Park Service is breaking its own rules, for it would be possible to construct bear-proof garbage cans. But perhaps the present facility for bears is really one of the attractions for tourists! Myself, I do not like bears, or garbage.

I drove, with all the other tourists, to the top of Clingman's Dome (6,643 feet). And thence walked down to Andrews Bald, a smaller edition of Gregory. Both of these are "grass balds."

Leaving the Park, I followed the Blue Ridge Parkway, 469 miles of wonderful and beautiful scenery. A short side trip took me to the top of Mt. Mitchell (6,684 feet), highest point east of the Rockies. All along the way I stopped to photograph flowers. Fire-pink *(Silene virginica)* was especially striking; and *Saxifraga michauxii* and *Potentilla tridentata* atop Mt. Mitchell; lavender masses of *Penstemon canescens;* and *Senecio smallii,* a roadside weed everywhere. The Parkway is continuous with the Skyline Drive of Shenandoah National Park.

And so back to NYBG after two thousand miles of new impressions and two hundred and fifty exposures—some of which, I hope, will be useful in Volume 2. H. W. R.

Mountain-asphodel or turkey-beard, *Xerophyllum asphodeloides,* on Mt. Mitchell. At right, close-up of its inflorescence.



Left, beetleweed, *Galax rotoundifolia,* on the trail to Gregory Bald.

Center, *Geum radiatum* on the face of the cliff that forms the summit of Mt. LeConte.

Right, *Rhododendron arborescens* on Gregory Bald; bees gathering pollen (right) and nectar.

EVENTS AT THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500)

GRADUATION EXERCISES OF CHILDREN'S GARDENCRAFT on Saturday, September 11, 1965, at 10 a.m., Auditorium, Museum Building.

SATURDAY AFTERNOON NATURE WALKS begin Saturday, September 11, 1965. Starting point, Museum Building, 1:30 p.m. Leader—Eleanor Yarrow.

"GENERAL INTRODUCTION TO THE ART OF BONSAI," illustrated Saturday Afternoon Lecture and demonstration by Yuji Yoshimura, on September 11, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music. The Bonsai Society of Greater New York will exhibit bonsai, September 11-12.

ELEMENTARY BONSAI (fall term) — Monday morning class, 10 a.m.-12 noon; Monday evening class, 8-10 p.m. Starts September 13, 1965. Museum Building. Instructor—Yuji Yoshimura.

ELEMENTARY BONSAI (fall term) Wednesday morning class, 10 a.m.—12 noon; Wednesday evening class, 8-10 p.m. Starts September 15, 1965. Museum Building. Instructor—Yuji Yoshimura.

BOTANY FOR BEGINNERS (fall term)—Wednesday morning class, 10 a.m.-12 noon; Wednesday evening class, 8-10 p.m. starts September 15, 1965. Museum Building. Instructor—Eleanor Yarrow.

FUNDAMENTALS OF GARDENING (fall term)—Thursday morning class, 10:00-11:30 a.m.; Thursday evening class, 8:00-9:30 p.m. Starts September 16, 1965. Museum Building, Instructor—T. H. Everett.

"A BOTANIST IN ANTARCTICA," illustrated Saturday Afternoon Lecture by Dr. S. W. Greene on September 18, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

FLOWER AND LANDSCAPE PAINTING (fall term)—Tuesday morning class, 9:45 a.m.-12:30 p.m. Starts September 21, 1965. Museum Building. Instructor—Edgar A. Whitney, A.W.S.

NON-FLOWERING PLANTS (In-Service Course for Teachers, fall term) 3:45-5.25 p.m. Starts September 22, 1965. Museum Building. Supervisor—Elizabeth C. Hall.

FLOWER AND LANDSCAPE PAINTING (fall term) Friday morning class—9:45 a.m.-12:30 p.m. Starts September 24, 1965. Museum Building. Instructor-Edgar A. Whitney, A.W.S.

"IN THE LAND OF THE SHILLELAGH," illustrated Saturday Afternoon Lecture by Anne Neylon, on September 25, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

DAHLIA CRESCENT, located near Research Laboratory—in flower late September well into October.

"ST. FIACRE, PATRON SAINT OF GARDENERS," illustrated Saturday Afternoon Lecture by Mr. and Mrs. William R. Epes, on October 2, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

TREES AND SHRUBS IN FALL (fall term)—10 a.m.-12 noon. Starts October 2, 1965, Museum Building. Instructor—Eleanor Yarrow.

SYSTEMATIC BOTANY (fall term—Monday morning class, 10:00-11:30 a.m.; Monday evening class 8:00-9:30 p.m. Starts October 4, 1965. Museum Building. Instructor—Dr. H. N. Moldenke.

HOUSE PLANTS IN FALL AND WINTER (fall term)—Thursday afternoon class, 1:45-3:45 p.m., Thursday evening class, 8-9:30 p.m. Starts October 7, 1965. Museum Building. Instructor—Robert Russo.

"EUROPE'S GIFT OF ROSES," illustrated Saturday Afternoon Lecture by Alice Dustan Kollar, on October 9, 1965, at 3:15 p.m., Auditorium of the Museum Building. Preceded by a half hour of recorded music.

INTERMEDIATE AND ADVANCED BONSAI (fall term)—Monday morning class, 10 a.m.-12 noon; Monday evening class, 8-10 p.m. Starts October 11, 1965. Museum Building. Instructor—Yuji Yoshimura.

INTERMEDIATE AND ADVANCED BONSAI (fall term)—Wednesday morning class 10 a.m.-12 noon; Wednesday evening class, 8-10 p.m. Starts October 13, 1965. Museum Building. Instructor—Yuji Yoshimura.

DESIGNING THE HOME GROUNDS (fall term)—10 a.m.-12 noon. Starts October 13, 1965. Museum Building. Instructor—Alice Dustan Kollar.

"BONNIE SCOTLAND," illustrated Saturday Afternoon Lecture by Gertrude J. Helbling, on October 16, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

CHILDREN'S PLANT WORKSHOP (fall term)—10:30-11:30 a.m. Starts October 16, 1965. Auditorium, Museum Building. Supervisor—Lillian Weber.

LANDSCAPE GARDENING (fall term)—8-10 p.m. Starts October 19, 1965. Museum Building. Instructor—Arthur F. Murphy.

"KEY WEST—PLANTS, PEOPLE AND FISH," illustrated Saturday Afternoon Lecture by Dr. Theodore Kazimiroff, on October 23, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"INVENTIONS OF NATURE," illustrated Saturday Afternoon Lecture by Dr. Harold N. Moldenke, on October 30, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

THEATRE BENEFIT—English musicale produced by David Merrick and starring Harry Secombe, under auspices of Advisory Volunteers, on November 4, 1965.

CHRYSANTHEMUM SHOW IN THE CONSERVATORY—November 7-21, 1965.

Admission to Saturday Afternoon Lectures, 25 cents, free to members of the Garden (upon presentation of membership card).
Nature Walks, fee $1.00 per person.
For fees of the various courses, see the Educational Program.

NEWS, NOTES and COMMENTS

Reception for Trainee-Gardeners. More jobs than there are trainee-gardeners to fill them—this is the achievement of a teenage training program which graduated its first class on June 24, 1965, at The New York Botanical Garden. Botanical Garden certificates were awarded to twenty-eight Christopher Columbus High School graduates who completed the two-year training.

The program's objective is to encourage students to remain in high school by supplying on-the-job training while their education continues, and to develop experienced craftsmen in labor-short professional gardening. These high school students attend classes and are trained at the Garden on an alternate week plan. They are paired—one at school and one on the job—so the job is always covered, and they are paid $52.88 weekly. The eighty-five thousand dollars, donated by individuals and foundations, went entirely to the first group of students; the Botanical Garden provided its services free. The City undertook the financing of the second group of students who will be graduated in June, 1966.

Featured speakers were Paul R. Screvane, President of the City Council, Dr. Bernard E. Donovan, Superintendent of City Schools, and T. H. Everett, Assistant Director (Horticulture) and Senior Curator of Education. Other participants in the ceremonies were Dr. William C. Steere, the Garden's Director, who presided and kept the speakers moving along on time and in a lively manner, Charles B. Harding, President of The New York Botanical Garden, and Edward R. Kolevzon, Principal of Christopher Columbus High School.

Mr. Harding, in introducing Mrs. Arthur Hays Sulzberger, remarked that the Garden had long been engaged in experiments in its Re-

search Laboratory, but this was its first experiment with human beings, and a most successful and rewarding one in which it took great pride. Mrs. Sulzberger, who first advocated the program and raised the funds which made it possible, presented the certificates.

Dr. Donovan, in addressing the graduates, emphasized "the unique opportunity that has been afforded you by Christopher Columbus High School and The Board of Education through the Municipal Cooperative Education Program, giving you a respect for work, a skill, and dignity in yourself. Now you are on your own—the school can no longer do anything further to advance your career, nor can the Garden, nor your parents. It is up to you individually to make the most of the training that has been given to you—and the opportunity to do so is unlimited."

Mr. Everett said, in part: "We have tended to overlook the importance of practical skills which can only be acquired by experience—the basis of craftsmanship. One can not learn to do fine cabinet making, to be a good stone mason, be a first-class electrician just by taking a course of lectures—one must do a job over and over again to become skilled. This, of course, was the basis of the old apprentice system.

"Boys started to learn a craft while they were young, malleable, and receptive. They learned by working side by side with skilled artisans. They were paid little or nothing—sometimes they paid for the privilege of working and learning. This arrangement made it economically possible for the employer to devote time and attention to training. His first concern need not be getting profitable results from this labor.

"However, the old-time apprentice had little or no opportunity to learn about the theories behind the work in which he was engaged or the sciences upon which his work was based. In this day it is desirable—indeed essential for the craftsman to know something of the theory as well as the technique of his trade.

"The Municipal Cooperative Education Program of the Board of Education of the City of New York is, in essence, an apprentice system fitted to modern requirements, making it possible for young people who are not oriented to academic pursuits to learn useful skills which will fit them for respected and rewarding occupations.

"A matter of grave concern to all serious-minded people has been the high proportion of youngsters who for economic and other reasons elect not to finish high school. The Municipal Cooperative Education Program seeks to minimize this trend. By providing half-time, paid, on-the-job training in useful crafts and half-time classroom instruction coordinated with the practical work, the economic and other problems of many young people are solved. The program is aimed at high school retention. Those who participate and complete the training acquire saleable skills as well as a high school diploma.

"Here in New York there existed a made-to-order situation to alleviate some of the difficulties besetting youth, for there is a demand for trained gardeners. The Board of Education was interested in cooperative education, a great Botanical Garden with facilities for and experience in the practical training of gardeners was at hand. All that was needed was a catalyst to bring the elements together for a useful purpose. The catalyst proved to be Mrs. Arthur Hays Sulzberger, at that time a new member of the Board of Managers of The New York Botanical Garden and an old friend of cooperative education. . . . She and she alone was responsible for raising over eighty thousand dollars to pay for the pilot effort. . . .

"The program started here in September, 1963, with thirty trainees, I recall my first meeting with this group of gangling, apprehensive youngsters, most of whom didn't know a marigold from a rose. Frankly, we were apprehensive too. But in the two years these boys have grown to be young men, have acquired useful skills and knowledge, have had extensive work experience, have worked alongside men and have been treated like men, have learned how to produce and the pleasures of working."

"Tonight is both an occasion for appreciа-

Reading left to right: Trainee gardeners Michael Balint, Ronald Bugge, Paul Bell, Michael Langdore, Donald de Angelis, Philip Alenda, Raymond Novy; T. H. Everett, Assistant Director (Horticulture) and Senior Curator of Education, Mrs. Arthur Hays Sulzberger, member of the Board of Managers of The New York Botanical Garden, and Edward P. Kolevzon, Principal of Christopher Columbus High School.

Mrs. Sulzberger, assisted by Nancy Callaghan, presents the Garden's diploma to one of the trainee gardeners, while Elizabeth C. Hall, Associate Curator of Education, calls his name. At left is Bride McSweeney, Assistant to Horticulturist Louis P. Politi, with the trainee gardeners who are waiting to be called to the platform.

Seated left to right are Mr. Kolevzon, Dr. Bernard E. Donovan, Superintendent of City Schools, Mr. Everett, Charles B. Harding, President of The New York Botanical Garden, Paul R. Screvane, President of the City Council, and Dr. William C. Steere, the Garden's Director. Concealed by Mrs. Sulzberger is Charles Lee, Director of Control, who represented Joseph F. Periconi, President of the Borough of the Bronx.

tion and graduation," said Mr. Kolevzon in his opening remarks, expressing appreciation to the Board of Education, the Garden and those who worked closely with the young men—Mr. Everett, Mr. Politi, and Miss Hall, the staff at Christopher Columbus High, and all others who helped to make this pilot project possible. Mr. Kolevzon then referred to the Christmas (1964) party, given at the Garden for the students and their parents, at which he had said that "the combined experience of learning and working both at Christopher Columbus and the Garden had transformed the boys from rudderless into well directed ships. I can say this even more fervently this evening than I said it then. We started two years ago with thirty boys uncertain what the future would hold—and we were a little uncertain ourselves. Twenty-four months later they have completed the program as young men, with the acquired skills of competent horticultural craftsmen.

"As Mr. Everett has pointed out, when one makes a mistake in gardening, one has to wait another twelve-month cycle to correct that mistake; mistakes are costly experiences, successes are gratifying. I'd like to carry this thought one step further. Each individual has only one opportunity for life on this earth, and we cannot afford to make mistakes with young people where their development is concerned. What this cooperative training program has done is to make certain not only that the community has a larger supply of trainee-gardeners, but also and more important that these young men have matured properly, secure in the knowledge that they have a vocational future. No parent, no educator, no graduate could ask for more. As Confucius said almost twenty-five hundred years ago, 'If your plan is for one year, sow rice. If it is for ten years, plant trees. But if your plan is for a lifetime, educate men.'"

Mr. Screvane expressed pride in the Municipal Cooperative Educational Program as carried out not only at Christopher Columbus High School and The New York Botanical Garden, but elsewhere in the City. In these various trainee programs there is only a three per cent drop-out as compared to a forty per cent drop-out under the usual school system. He also commented that only three per cent of the City's students come in conflict with the law, that ninety-seven per cent of the young people are good; and he felt it a pity that the misbehavior of the three per cent is dwelled upon, the good behavior of the ninety-seven per cent is overlooked. "You," he said to the graduates, "are of the ninety-seven per cent."

In concluding his remarks, Mr. Screvane said, "If I was not in government, I'd go into gardening. The arguments for it have been so convincing this evening, especially Mr. Everett's."

Student-Horticulturists Appointed at Garden. Under a new training program, which became effective July 1, 1965, three young men were appointed student-horticulturists at The New York Botanical Garden. They are Marco Polo Stufano of Richmond, Long Island, N. Y., a graduate of Brown University; John B. Wells of Lexington, Kentucky, a graduate of the University of Kentucky; and David A. Blades of East Providence, Rhode Island, a graduate of the University of Rhode Island.

The program is designed to expand the appointees' experience in and knowledge of gardening and of the sciences upon which gardening is based, and to provide a background which will be valuable in any supervisory or managerial positions they may later occupy.

Student-horticulturists are required to be high school graduates with at least two years of experience in good private gardens, nurseries, public parks, or similar establishments, or to be college graduates who have majored in horticulture. The age limit is from twenty to twenty-six years old.

They will devote the greater part of each forty-hour week to practical work, under supervision, in the various gardens, greenhouses, and the arboretum. The remaining hours will be spent in attending the Garden's Two-Year Course in Practical Gardening (morning school), the Two-Year Course in Botany (morning school), and the Two-Year Course in Landscape Gardening (evening school), and in occasional visits to horticultural establishments.

Frederick S. Moseley, Jr., Vice President of The New York Botanical Garden, raised a special fund of approximately $60,000 for this program. It will furnish each student-horticulturist a stipend of $3,600 for the first year and $4,200 for the second; also books, herbarium sheets, and similar supplies.

Henry Allan Gleason Award of The New York Botanical Garden was established in 1963 through a gift from Dr. Gleason, Head Curator Emeritus, for an outstanding recent publication (book or article) in botany. The Award, which is given annually—a handsome certificate and check of approximately $100—was presented on August 18, 1965, at the annual dinner of the Botanical Society of America to Rupert C. Barneby, Honorary Curator of Western American Botany, for his monumental work *Atlas of North American Astragalus*. This event was held at the University of Illinois, during the meetings of the American Institute of Biological Sciences.

More on the Guatemala Tour. An additional expert has been added to the staff of the Garden's Guatemala Tour, October 22-November 6, 1965. He is Antonio Molina, a youthful botanist from Honduras, who is particularly well acquainted with Guatemalan native plants and who has collaborated with Dr. L. O. Wil-

Frances M. Miner, Curator of Instruction and Deputy Director of the Brooklyn Botanic Garden, addresses the graduates on "The End or the Beginning."

Oakleigh L. Thorne, member of the Board of Managers, presents certificates to Elizabeth A. Straus (left), his wife Honoré W. Thorne (center), and Jerome A. Eaton (right), Director of Westbury Gardens, at the reception for graduates in the Garden's Two-Year Courses.

liams of the Chicago Natural History Museum, a leading specialist on Central American flora. Permission for him to accompany the Tour was given by Dr. Albert S. Muller, Director of the Escuela Agricola Panamericana, where he is a member of the staff. Other plant experts, headed by Dr. William C. Steere, Director of The New York Botanical Garden, will include both botanists and horticulturists.

There still is room for additional persons on the Tour, according to Phil Clark, Tour Director, but reservations must be made as soon as possible. Reservations may be arranged by telephoning Mr. Clark at the Garden, Area Code 212—LU 4-8500, or writing the Garden's Guatemala Tour, The New York Botanical Garden, Bronx, New York 10458. Tour price, including a $400 tax-free donation to the Garden, is $1,198.

Study Shrub Collection. Preparation of the new study shrub collection began this summer. Some of the young men working at the Garden under the Summer Youth Program have been assigned to the jobs of deep digging and spreading fertilizer to get the soil in proper condition to receive the plants.

This addition to The New York Botanical Garden's plantings, which is located west of the Conservatory, is primarily educational and demonstrational—to acquaint the public with the botany, the culture, and the landscape use of hardy shrubs. The shrub collection will accommodate, it is anticipated, a wide variety including rare kinds as well as those readily obtainable. Some will be chosen as representative of certain families and genera so that the observer can become familiar with identifying characteristics; others for their flowers which bloom at particular seasons or their berries which attract birds, or for the color and texture and form of their leaves.

Arthur Murphy, landscape architect in consultation with T. H. Everett, Assistant Director (Horticulture), and Louis P. Politi, Horticulturist, has prepared a master plan for the two acres to be developed. Mr. Everett and Mr. Politi will select the plants, with Mr. Murphy and others cooperating.

Initiation of this important acquisition to the Garden's living plant collections has been made possible by the generous gifts of funds by Dr. Lyndon Brown, a member of the Board of Managers.

Activities of the Director and Staff. Dr. William C. Steere, Director, recently made a field trip to Puerto Rico to study the effects of irradiation on a tropical rain forest. This was a follow-up of the pre-irradiation study of the same area made in December, 1964. Dr. Steere served on an advisory committee to appraise the present Department of Biology at Rutgers—The State University in New Brunswick, New Jersey, and this past month attended the meetings of the American Institute of Biological Science held at the University of Illinois in Urbana.

Dr. Steere and Dr. Stanley Greene, of the University of Birmingham, England, made a trip to Alaska in midsummer to observe mosses in the field as part of their joint investigations of these plants under a grant from the Arctic Institute of North America.

Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Botany, and Mrs. Maguire departed on August 12, 1965, for an extended exploration of Cerro de la Neblina; they will return about Christmastime. Cerro de la Neblina has now been declared to be jointly shared by Venezuela and Brazil, thus making Pico Phelps the highest point in all Brazil.

Dr. Maguire will be joined by Dr. Julian Steyermark of the Instituto Botánico, Caracas, Venezuela, and Dr. João Murça Pires, Head of the Department of Botany at the Universidade de Brasilia, on this joint expedition of the Garden and the Universidade de Brasilia.

Dr. Herman F. Becker spent the summer with the Department of Botany at the University of Michigan, returning to the Garden the first of September. On July 1, 1965, Dr. Becker was appointed Curator of Paleobotany by the Director, Dr. Steere.

Dr. Howard S. Irwin, Jr., Curator, and his family left these shores on August 29, 1965, for Brazil where he will undertake the second phase of the long-term exploration principally in the States of Minas Gerais and Bahia. This portion of the National-Science-Foundation-supported project will take about one year. Mrs. Irwin will teach at and the Irwin daughters will attend the American School Association of Brasilia. John W. Grear, Jr., graduate student at the Garden, will participate in the field operations for several months in early 1966, and one or two researchers from C. S. I. R. O. of Australia will join the field operation for a few weeks to obtain seeds of grasses and legumes for introduction to that country.

Dr. Ghillian Prance, Research Fellow under Dr. Maguire, also departed from the Garden in August, 1965, to work out of Belém, Brazil, for two months on tropical Amazonian problems under the joint sponsorship of The New York Botanical Garden and the Instituto Agronomico do Norte.

Dr. Tetsuo Koyama, Associate Curator, has been appointed Secretary-Treasurer of the Association for Tropical Biology as successor to Dr. Howard S. Irwin, Jr.

Dr. P. P. Pirone, Senior Plant Pathologist, was interviewed on the Long John Nebel Show on NBC radio early in July, 1965, as a result of the two-page story about his work that appeared in the Pictorial Living Section of *The New York Journal-American* on July 4, 1965.

Dr. Annette Hervey, Senior Research Associate, lectured before the Mens' Garden Club of New York, her topic "How Tiny Plants

Louis P. Politi, the Garden's Horticulturist, and Arthur Murphy, Senior Landscape Architect of the New York City Park Department, in charge of Planting Design, examine the master plans for the study shrub collection. At right, young men working at the Garden under the Summer Youth Program prepare the ground for the study shrub collection.

Solve Big Problems," and attended the Symposium on Genetic Control of Differentiation held at Brookhaven Laboratories, Upton, L. I.

Dr. Trevor McMorris, Research Associate, attended the forty-eighth annual conference of the Chemical Institute of Canada in Montreal.

Elizabeth Hall, Associate Curator of Education, was one of the speakers on the Mohonk Garden Holiday Program, August 30-September 2, 1965; her subjects, "Book of the Garden" and "Plants of the Bible." She was also co-leader with Alice Dustan Kollar of "Garden Clinic."

Dorothy Ebel Hansell, Editor of *The Garden Journal*, will attend the American Horticultural Congress and the annual meetings of the American Association of Botanic Gardens and Arboretums and of the Garden Writers Association of America, all of which will be held at Callaway Gardens, Pine Mountain, Georgia, October 12-16, 1965. During the current month Mrs. Hansell will serve as judge at the Flower and Vegetable Show of the Passaic Township Grange, the twenty-first annual Garden Show of the Royal Globe Insurance Group, and the annual exhibition of the American Dahlia Society and the New Jersey Dahlia Society. In August she and Phil Clark, Assistant to the Director (Public Relations), were members of the panel of judges appointed by the New York City Housing Authority to judge gardens in project developments. Mrs. Hansell also served on the committee, appointed by President Courtney Smith of Swarthmore College, to select the recipient of the Arthur Hoyt Scott Garden and Horticultural Award. The honor was conferred upon Richard C. Farnham, Executive Secretary of the Horticultural Society of New York.

Dr. David J. Rogers, Curator of Quantitative Taxonomy, who joined the Garden's staff as Curator of Economic Botany, in 1957, left September 1, 1965, to become Professor of Taxonomy at Colorado State University, at Fort Collins. He will continue his interests in quantitative taxonomy, developing it as a discipline at the University.

Henry Fleming, Research Associate, and a member of Dr. Roger's department since December, 1961, also joined the faculty of Colorado State University on September 1, 1965, as Associate Professor of Taxonomy. Mary Fleming resigned as Technical Assistant in the Cryptogamic Herbarium, a post she has filled since November, 1957, to accompany her husband.

Dr. Eugene Jablonski, Honorary Curator of Tropical Botany, spent two months this summer in European herbaria in pursuit of his studies in the neotropical *Euphorbiaceae*.

Noel Holmgren, Charles La France, and James Reveal have been collecting plants in Utah this summer for Dr. Arthur Cronquist, Senior Curator, under his grant from National Science Foundation on the intermountain Flora.

Trainee-Gardener Matthew Pozutto was interviewed this past summer by Ruth Alampi during her Home and Garden Show on WNBC.

Dr. Vernon Stoutemyer, who had been a Visiting Investigator at The New York Botanical Garden and the Rockefeller Institute since February 1, 1965, returned to his duties at the University of California and also to a new appointment as Director of the Associate Experiment Station, Los Angeles Division, of the California Agricultural Experiment Station.

Dr. Victor M. Badillo, Director of the Instituto Botánico, Universidade Central de Venezuela, Maracay, has been spending several months at the Garden in connection with his investigations in the *Caricaceae*, especially *Carica papaya*.

Ethel Anson S. (Mrs. Wheeler H.) Peckham. Word reached The New York Botanical Garden only recently that Mrs. Peckham died on February 23, 1965, at the age of eighty-seven. She had been Honorary Curator of the Iris and Narcissus Collections since July, 1927; a member of the Corporation since January, 1931; and a member of the Advisory Council (now the Advisory Volunteers) from 1931 until she resigned in 1936.

The Advisory Volunteers of The New York Botanical Garden are now located in their new headquarters in the China Institute at 125 East 65th Street, New York, New York 10021.

Inadvertently, the Advisory Volunteers were referred to as The Volunteer Associates on page 174 of the July-August, 1965, issue.

Prehistoric Garden at Dinoland. The exhibit of the Sinclair Refining Company at the New York World's Fair has germinated an idea in the minds of visitors who possess "green thumbs." They ask, "If a prehistoric garden can be grown in the city, why can't I grow one at home?" and to this question, Dr. Herman Becker, Curator of Paleobotany at The New York Botanical Garden, has replied, "They can. Many gardeners already have descendants of fossil plants on their land—the elm, magnolia, oak, maple, ailanthus, birch, ginkgo, hickory, persimmon, grape, water-lily, fern, mountain-lily, and holly. If the gardener lives in the South or the tropics, he may have palms, figs, bread fruit, and custard-apple on his place."

The prehistoric garden at Dinoland was planted to provide appropriate surroundings for the life-size dinosaur reproductions. There are forty-two ginkgoes, twenty-two southern magnolias, one hundred metasequoias, thirty-seven ailanthus or tree-of-heaven, fifty-eight pines, and a variety of evergreen shrubs.

General Motors Futurama at the New York World's Fair received a Plant America Award from the American Association of Nurserymen, in recognition of achievement in industrial beautification. The site of this exhibit is one of the finest examples of landscaping within the Flushing Meadows fairgrounds.

Some two hundred tons of moss rocks, chosen because of their aged or eroded appearance, look as though they had always been on the site instead of having been transplanted from Pine Island, New York. Among the 269 trees, both deciduous and evergreen, are weeping beech, American and Japanese dogwoods, crab-apples, Japanese cherries, honey-locust, magnolias, red and silver maples, oaks, white birch, styrax, weeping cutleaf Japanese maple, American, Austrian, and Korean pines, golden larch, and weeping hemlock. These are under-planted with more than five thousand azaleas. rhododendrons, mountain-laurel, andromedas, yews, junipers, and hollies, and such deciduous shrubs as forsythia, viburnum, weigela, bayberry, and privet.

Seventy-five thousand square feet of Merion bluegrass sod was used for the lawn.

Blumea, Vol. XIII, No. 1, 1965, carried a review by Ding Hou of *Coloured Illustrations of Herbaceous Plants of Japan* (III, Minocoty-

Youths under the Summer Youth Program at The New York Botanical Garden are engaged in painting the conservatory, installing an oscillator in the Children's Gardens under the supervision of Joseph Alvarez (center), and repairing pipes in the Propagating Range.

ledoneae) by Siro Kitamura, Gen Murata, and Tetsuo Koyama, the last one of the Garden's Associate Curators. "The book is more or less in the style of a manual or flora and was based chiefly on the material deposited in the herbarium of Kyoto University. There are twenty-six families, arranged according to Engler's System, containing 797 indigenous and commonly cultivated plants. . . . Most of the species are illustrated. There are 108 beautiful plates, 64 in color. . . . In addition there are 256 text figures by the authors to facilitate identification."

Callaway Gardens, Pine Mountain, Georgia, will be the site of the twentieth American Horticultural Congress, at which the American Horticultural Society, the American Association of Botanic Gardens and Arboretums, the Georgia Horticultural Society, and the Garden Writers Association of America will gather together for certain events and will also hold separate sessions.

Scheduled to appear on the five-day program, October 12-16, 1965, are Dr. Frances de Vos, Assistant Director of the United States National Arboretum, on "Plant Explorations in the Himalayas"; Dr. Sigmond L. Solomosy on "Native Plants" and Professor Ira Nelson on "A Plant Trip to South America," both of the University of Southwestern Louisiana; Edwin Menninger, "The Flowering Tree Man" of Stuart, Florida, on "Flowers of the World"; Professor Joseph McDaniel, of the University of Illinois, on "Collecting Magnolias in Mexico and Guatemala."

Tom Fennell will discuss orchids; George Hull, bonsai; Elizabeth Lawrence, broad-leaved evergreens; J. D. Throckmorton, daffodils; and there are others. The program has been planned to provide pertinent information for the diversified interests of the attendants.

Anyone interested in plants would find Callaway Gardens, a twenty-five hundred acre complex in the Southern Appalachians, well worth visiting. It has a large collection of American, English, and Oriental species of *Ilex* and collections of *Magnolia* and *Chaenomeles;* many species and cultivars of rhododendrons, and many native azaleas such as *R. alabamense, R. arborescens, R. austrinum, R. bakeri, R. calendulaceum, R. canescens, R. prunifolium,* and *R. serrulatum.* In addition to these native species the Azalea Trail is a big splash in April and early May with the Kurume, Indian, and Glenn Dale hybrids and the later Satsuki and Chugai hybrids. Along the Wildflower Trail there's a wealth of native herbaceous plants. Among other features to delight the plantsman, professional or amateur, is the seven-and-one-half-acre vegetable garden which produces four hundred varieties of vegetables, fruits, and herbs, and is probably one of the largest demonstrations of its kind.

U. S. D. A. Explorers Back from Himalayas. Dr. Francis de Vos, Assistant Director of the National Arboretum, and Dr. Edward G. Corbett, Horticulturist at the Plant Introduction Station at Glenn Dale, Maryland, brought back unusual species of ornamental plants and one hundred and fifty herbarium collections from their two-month trip to the Himalayas. Species of *Rhododendron* and several hardy, low-growing, evergreen shrubs, and an attractive

Garden improvements include traffic isles (above) to help direct the flow of traffic and new garden steps (right) which Richard Brown, Superintendent of Buildings and Grounds, is inspecting.

species of false Solomon's seal *(Smilacina)* and one of jack-in-the-pulpit *(Arisaema)* were among the almost two hundred living collections Dr. de Vos and Dr. Corbett believe may have promise as ornamentals for American gardens.

They were especially interested in collecting species rhododendron for use as "pure" parents in breeding improved kinds. Of the ten species brought back, *R. arboreum* found at an elevation of twelve thousand feet is especially exciting, because it may be hardier than plants of this species now growing in the United States. This tree-type rhododendron is now limited to the warmer areas of the West Coast.

Of the smilacina, Dr. de Vos has this to say: "The flowers are the purest I have ever seen, and this pure white is contrasted by a light pink to red stalk."

This is the ninth ornamental plant exploration sponsored cooperatively by the U. S. D. A. Agricultural Research Service and Longwood Foundation, Inc., of Kennett Square, Pennsylvania. On this trip Dr. de Vos and Dr. Corbett explored the Singalila Range which extends along the borders of West Bengal in India, Sikkim, and Nepal.

A.A.R.S. Award Winners. Two hybrid teas, 'American Heritage' and 'Matterhorn', and a floribunda, 'Apricot Nectar', take their place among the roses that have received the A.A.R.S. award during the past seven years. Plants will be available in limited quantities this fall at leading nurseries and garden centers or from mail-order rose concerns.

'America Heritage' has buds of cream and light canary-yellow which, on opening, are tinted with scarlet and vermilion; the edges of the petals are suffused with crimson. The large, semiglossy, dark olive-green leaves are highlighted by deep red. This variety is resistant to to rust and black spot. 'Matterhorn' bears its five-inch wide, creamy white flowers on long, strong stems; there is a hint of green deep within the flower. The vigorous, well-shaped plant is covered with the glossy, bright green foliage. 'Apricot Nectar' is the ninth florabunda bred by Eugene S. Boerner to win an All-America award. It derives flower-size and vigorous growth of plant from its parent 'Sparta', and produces large clusters of attractive buds which open into clear apricot blooms. The rich green foliage is disease resistant.

Another fine rose originated by Mr. Boerner, and introduced this year by Jackson and Perkins, has been named 'John F. Kennedy'. It is an outstanding white hybrid tea.

Burpee's Marigolds won awards at the Royal Horticultural Society's trial grounds, Wisley, England. 'Hawaii', a sweet-scented orange variety, won a First Class Certificate and an Award of Merit; and 'Mr. Sam', 'Toreador', and 'Yellow Climax' each received an Award of Merit.

Pennsylvania Horticultural Society has appointed James P. McCarvill as flower show manager, his responsibilities being centered around the Society's spring flower show.

Encouraged by its 1965 Spring Flower Show, the Society will stage a major show March 11-17, 1966, at the Philadelphia Civic Center (formerly the Trade and Convention Center and just recently renovated). Taking its cue from the White House Conference on Natural Beauty, the Pennsylvania Horticultural Society will emphasize natural beauty as it applies to city and suburb; the spring show will feature beautification of home grounds and landscapes, as well as horticultural techniques and skills.

Mrs. Koh Chiba, wife of the Japanese Ambassador to the UN, and her daughter Yoshiko Chiba visited The New York Botanical Garden. Here, accompanied by Mrs. William C. Steere, wife of the Garden's Director, Dr. Tetsuo Koyama, Curator, Mrs. Samuel McCrae Cavert, and Miss Helen E. Nast, they admire *Allium giganteum* growing in the Herb Garden. Mrs. Cavert is a member of the National Board of Trustees of the International Christian University in Tokyo, and Mrs. Nast is on the staff of the UN.

John Walker, Executive Director of the Society of American Florists and Vice President of the American Horticultural Society, has been appointed to the Advisory Committee of "Project Dimension," an experimental research project approved by the United States Department of Health, Education, and Welfare. Division of Vocational and Technical Education. "The project is charged with the responsibility of developing and evaluating instructional units in ornamental nursery, floriculture, and turf occupations."

The National Chrysanthemum Society, Inc., U.S.A., will hold its twenty-second annual meeting and show at the Governor Morris Hotel, Morristown, New Jersey, October 22-24, 1965. "Colonial Heritage" is the theme of the show to be open to the public, 2-10 p.m. on October 23 and 11:30 a.m.-4:30 p.m. on October 24, 1965.

The Joseph Curran Building, the new home of the National Maritime Union, located at West Thirteenth Street and Seventh Avenue, New York City, has a feature of special interest to gardeners. This is its sky-lighted indoor garden on the sixth floor. The garden, designed and executed by Luther Greene, well-known New York City landscape architect, contains plants from the many ports of call around the world which seamen visit. In addition there are outdoor plantings on the sixth floor—trees, shrubs, and flowers in specially designed "smokestack planters."

There are free conducted tours on Mondays through Fridays, at 9, 10, and 11:00 a.m., and at 1, 2, 3, and 4 p.m. The boatlike building itself is unique; it was designed by Architect Albert Ledner of New Orleans, a student of the late Frank Lloyd Wright, to carry out the theme of ships and seas.

Miss Chiba confers with Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Research. An undergraduate student in the Department of Botany at the International Christian University, Miss Chiba is now studying at the University of Mexico for several months.

The Holly Society of America, at its meeting in Norfolk, Virginia, endorsed the proposal that Route 17, now a narrow two-lane highway, be developed into a dual highway, with the Dismal Swamp canal as a reflecting basin in the center, and that a strip of land on each side of not less than one hundred feet wide from the edge of the canal to the edge of the road be landscaped with exotic and native plants which the deep, rich soil can support. The Society's endorsement included the recommendation that representations of every kind of holly that will grow in the area be included in the planting.

The canal, the oldest waterway in use on the North American continent, runs from Lake Drummond west to White Marsh where it connects with the Nansemond River, thence to Suffolk.

The proposal was presented by Frederic Heutte, Director of the Norfolk Botanic Garden. This vast area in southeastern Virginia and northern North Carolina, to which Colonel William Byrd II gave the name Dismal Swamp after his visit with a survey party in 1728, is receiving considerable attention these days. Mr. Heutte revealed ways in which this land could be used to advantage. In fact, a survey is being made by the State of Virginia for this very purpose, and Senator Gordon Marsh of Chesapeake is the person responsible for the revival of interest in creating a park which would have few parallels.

It was twenty-five years ago when Mr. Heutte first saw the Dismal Swamp and visualized what might be done to transform its overgrown banks as had been done at Cypress Gardens and other places in the South. In the passing years, he has learned to appreciate the unusual climatic conditions of Tidewater Virginia in which plants from different temperature zones can be grown, and to recognize all the more fully what could be done to develop Dismal Swamp, or what remains of it, into a unique scenic and floral attraction. Thousands of acres have been purchased by a real estate corporation which is turning some of the acreage into farm land and hopes to sell other acreage to housing developers for Norfolk's expanding population.

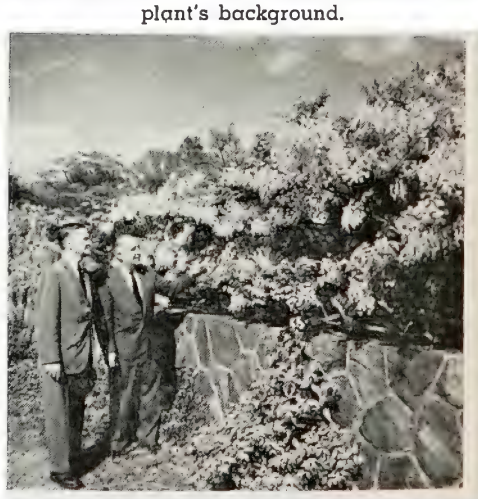
Mr. Heutte was distressed when he learned several years ago that sections of the Swamp were being drained for additional farm land and such industrial uses as could be made of it. Fortunately this land drainage occurred farther south, in North Carolina, and so some of the wild beauty that exasperated Colonel Byrd and fascinated George Washington still exists in Virginia. Instead of industries which would belch smoke on this land, Mr. Heutte hopes that nurseries which would benefit from the equable climate and abundant fertile soil will develop and become an important center for growing a great diversity of plant material. One nursery "Greenbrier Farms," located near the north end of Dismal Swamp, is reputed to be the world's largest nursery.

Imaginative designing of and landscaping this proposed highway could make it the rendezvous of plant lovers from all over America. To preserve Dismal Swamp is one thing, to make it available for many to enjoy is another, but to capitalize on its attributes should be the aim of twentieth-century Americans as a legacy to future generations, said Mr. Heutte, and the members of the Holly Society of America concurred.

News from a Trainee Gardener. Mr. Everett received the following letter from John McManus, one of the trainee gardeners who came to The New York Botanical Garden in September, 1963, and was graduated in June, 1965. He was placed as an assistant and to continue his studies with Robert Weidner in California. (Mr. Weidner, a student gardener at the Garden in 1936-1938, later foreman gardener, is now proprietor of Buena Park Greenhouses and one of the largest growers of foliage and tropical pot plants in the United States.)

"I am thrilled with this whole place, and the people are just wonderful. The Weidner family is a great bunch of people, the kids remind me of my own brothers. I don't know what else to say, but I am sure glad I was the one to come out here. Say 'Hello' to everyone for me. I will be writing again."

G. M. Whitehouse, Facilities Manager of General Foods Corporation, White Plains, New York, admires the white-flowering wisteria on the stone wall surrounding the Thompson Memorial Rock Garden in May, 1965, while Dr. P. P. Pirone tells of the plant's background.



BOOK REVIEWS

MAN AND NATURE OR, PHYSICAL GEOGRAPHY AS MODIFIED BY HUMAN ACTION. George Perkins Marsh. 472 pages, indexed, with an introduction and notes on the text by David Lowenthal, editor. The Belknap Press of Harvard University Press, Cambridge, Mass. 1965. $7.95.

Originally published in 1864 and now reissued by the Belknap Press and the John Harvard Library of the Harvard University Press, *Man and Nature* has paved the way for the current schools of thought in conservation policy and education. The late John F. Kennedy said of the author: "George Perkins Marsh pointed out a century ago that greed and shortsightedness were the natural enemies of a prudent resources policy."

The text reprinted here and skillfully edited by David Lowenthal is the text of the first edition, though the text underwent several later editions and two translations into Italian. Not a trained scientist but a skillful observer, Marsh was a lawyer, politician, historian, and diplomat. His early life in rural Vermont and his later extensive travels to areas of the globe where man's devastative effects on his physical environment were already well documented and readily observed provided Marsh with the background for this text which he wrote during the early part of his ambassadorship to Italy, a land where misuse and degradation of the resources were much in evidence.

Published at the height of a period in America when all but a few viewed the nation's natural resources as inexhaustible, Marsh's book had an instant impact and served as a call-to-arms in the fight for that which we now term multiple-use conservation or management practices. The esteem with which this most fundamental of conservation texts is held by modern conservationists is perhaps best expressed by Stewart Udall's *The Quiet Crisis* in which Mr. Udall states: "Here then, is a rescient book, with the scientific and moral foundations of a new land policy approach. George Perkins Marsh has been called the 'fountainhead of the conservation movement,' and with the perspective of a full century we can perceive that his words—and those of his fellow dissenters—were the beginning of land wisdom in this country."

The actual intent of the author is outlined briefly in his preface in which he indicates a desire to show both the character and the extent of the changes in the physical condition of the globe, to caution against waste and wanton destruction or disarrangement of both the organic and inorganic worlds, to show the value of reclamation or rearrangement, and finally, to show that man above all other animals may modify the physical world in such a fashion that nature alone cannot heal itself from the inflicted wounds. All the above the author accomplishes in a skillful, delightful-to-read, well-documented manner which makes the reading of *Man and Nature* a must, not only for the professional or student of conservation, but for each responsible citizen of our land. The struggle or struggles which Marsh described in 1864 are the same struggles which our nation faces today. The citizen must be informed and, even more important, made to believe that our natural resources are exhaustible, that man's damage to the earth's surface may be and often is irreversible, and that the only salvation is long-term management, not short-term profit-taking. Marsh's text, *Man and Nature*, is a remarkable step in the right direction and its reissuance, a century after its first appearance, is most timely and welcome to all who feel any degree of responsibility for the generations of land-users to follow.

RONALD DAGON

DWARFED FRUIT TREES. Tukey, Harold B. 562 pages, illustrated, indexed, bibliography. The MacMillan Co., New York. 1965. $15.00.

Dwarfed Fruit Trees is the finest, most complete, and usable publication in this field. We are indeed fortunate that after devoting much of a lifetime to the subject, Dr. Tukey has presented in scientific form, and yet in a practical way, all the information anyone could desire regarding dwarfed fruit trees.

The student searching for "how a tree is dwarfed" can find his information here. The propagator and nurseryman will do a better job after consulting this book. The commercial fruit grower will use it, and the hobbyist will go into ecstasies in finding how to train and prune his favorites. The educator will find it an indispensable resource, and the ornamentalist whether professional or otherwise cannot do without it. How the author can pack so much information covering so wide a scope into one publication is truly phenomenal.

Producing fruit from dwarfed plants has fascinated mankind for ages. Dr. Tukey has interestingly presented a brief history and has compiled what is probably the most complete bibliography on this subject to be found anywhere.

Arrangement of the book in seven parts makes it particularly usable. It is fascinating enough to read from the beginning in its entirety, yet any facet can be utilized as a reference by itself. If the table of contents does not show what one wants, consult the unusually complete index.

More than one hundred and fifty illustrations are particularly good. The photographs which Dr. Tukey has selected to make certain points have reproduced far better than average and the line drawings vividly depict much valuable information. Those relating to pruning and training stand out, but so do all of them.

Dr. Tukey expresses himself clearly and in sufficient detail, yet does not get lost in detail. The propagation of dwarf rootstocks is most difficult, but the author explains and shows how in steps that can be easily followed. His explanation of training systems will help the novice and even the most competent. The scientist will not be bored and the average man will understand. Dr. Tukey is adept at covering a broad complicated subject in a fascinating, understandable way for all, even showing costs for establishing some apple orchards on dwarf rootstocks. The bonsai enthusiast will want to consult the chapter on this subject.

Dwarfed Fruit Trees for Orchard, Garden and Home with Special Reference to the Control of Tree Size and Fruiting in Commercial Fruit Production is the most complete volume on the subject and is written by the world's greatest authority, Dr. Harold B. Tukey. It should be in every public and college library and one day will be a collector's item.

NORMAN H. FOOTE
State University Agricultural and Technical College
Farmingdale, New York

THE BIRDS OF CAPE COD, MASSACHUSETTS. Hill, Norman P. 364 pages, illustrated, indexed. William Morrow & Co., New York. 1965. $6.00.

For the library of the bird student of eastern Massachusetts, especially on the Cape, Martha's Vineyard, and Nantucket, and for any scientific library this book would be a welcome addition. It is similar to but much larger than *Birds of Martha's Vineyard* by Ludlow Griscom and Guy Emerson printed privately in 1959. It is not a field guide, but is for checking and rechecking which birds have so far been recorded. The backbone of the "Systematic List," occupying about eighty per cent of the book, has been culled from the "many volumes of notes" on Griscom's field work on Cape Cod from 1929 until about 1955. These are to be deposited in the Peabody Museum, Salem, Massachusetts. Mr. Griscom, it may be remembered, held the record for a long time for seeing the greatest number of species of birds in a year in North America.

This book has an attractive extra cover of an air-view of the Cape and very clear endpaper maps. The "Description of the Area" is very good. Scientific names of the plants of the different areas are given. "Ornithological History" is divided into three periods: From 1620 to 1865 the Cape was quite inaccessible except by boat or by foot. 1865-1912 is referred to as the sportsman-naturalist period or the rise of scientific ornithology. At this time railroad travel made the Cape available not only to hunters and naturalists who added to museum collections, but also to the commercial plume and wing collectors who quite decimated certain species, especially the great tern colonies. Many men, such as Thoreau, wrote of their visits at this time. The third period, from 1912 to the present, is the age when automobiles and even beach-buggies get people all over the place. But this has also been a time when field ornithology has risen to the dignity of a science. Griscom (1890-1959) kept his careful notes, the Oliver L. Austins, father and son, had their ornithological station where bandings were done by the thousands, especially on tern colonies. Their station is now owned and operated by the Massachusetts Audubon Society as the Wellfleet Bay Wildlife Sanctuary. Henry Beston wrote his *The Outermost House* at Nauset which now has been made a National Monument. Just recently the long eastern beach has been set aside as the Cape Cod National Seashore Park.

The "Sources of Data" for this book are 1) museums at Harvard, Boston, Salem, Chicago, New York, Lincoln, Massachusetts, and Wellfleet Bay; 2) banding records of the Austins, Elizabeth Burbank, and others; 3) field notes of Brewster (1870-1905), Griscom, Stanley Cobb, Osborne Earl, John Bishop, and the author Norman P. Hill; 4) published books (a good bibliography is found at the end of the book); 5) magazine articles of reported birds. These latter are taken with caution.

The "Outline of Treatment" is very thorough. For each species in the "Systematic List" the following are given whenever possible: status;

seasonal occurrence—spring summer, fall, winter, and also earliest arrival date, average arrival date, counts, average departure date, latest departure date; distribution—pastures, moors, shoreline traps; well-documented history; and some mention of subspecies. As to numbers reported, the author says, "This may represent increase in observation rather than a true increase in occurrence."

The last chapter, "Ornithological Summary," is an excellent gathering-in of all this vast body of information. It would be well worth studying by any lover of birds whether Cape Cod is accessible or not. The statistical section lists 354 species recorded with thirty other species listed as hypothetical. Sections on breeding and wintering contain much discussion on weather on the Cape. The general warming tendency here in the North has brought some changes in species. The late cold springs with their usual fogs and the long warm spells in autumn are due to the nearness of the large body of the Atlantic Ocean, which takes most of the summertime to warm up. There have been also changes in bird populations because of the increase of people or the abandonment of old lands. Much of the Cape was deforested in the early days, since the land had to be cleared for farms and the wood was needed for fuel. These clearings were followed by meadows and later by woodlands again. Some birds, like the gulls, "are probably only recapturing long-lost territory." An increase in interest in and knowledge of birds with more winter feeding stations is another one of the factors in the changes in breeding and wintering. The section on migration brings out the great difference between the one hundred species passing through in spring and the two hundred species in the fall, when the chill northwesterlies and the milder season on the Cape cause one of the great passages of birds along the eastern outer beaches and on along the Atlantic Coast or over the ocean to the islands of the Carribean.

GRACE COIT MELENEY
White Plains, New York

LANDSCAPE ARTIST IN AMERICA: THE LIFE AND WORK OF JENS JENSEN. Eaton, Leonard K. 240 pages, illustrated, bibliographical essay. University of Chicago Press, Illinois. 1964. $10.00.

Jens Jensen came from Denmark to Florida in 1884, when he was twenty-four, and after a year moved to Iowa; for the rest of his life he lived and worked in the Midwest. His personal style was firmly established during the years in which he landscaped a series of parks for the Chicago Parks Department (1886-1900, 1906-1920). In these designs, in his later private work, and in the philosophy of The Clearing, the school he maintained from 1935 until shortly before his death in 1951, there are two persistent characteristics: a nearly mystical sense of the relationship between man and the landscape, and the advocacy of the use of native plant materials to form the design.

Leonard Eaton has furnished a perceptive but somewhat repetitive text to accompany this collection of photographs of those works of Jensen that have not been destroyed or seriously altered. As there are, in most cases, only four or five photographs of the plantings under discussion, and in only six of the projects described are Jensen's plans reproduced, the book is a representative rather than definitive treatment of an important figure in the history of American landscape design.

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MUSHROOMS, MOLDS, AND MIRACLES. Kavaler, Lucy. 318 pages, indexed. The John Day Co., New York. 1965. $6.50.

This is a fascinating book. In popular language the author tells the story of the "strange realm of fungi," stressing the impact that fungi have on man's welfare. History, folklore, fact, and fiction are woven together in chapters dealing with fungi as food, fungi and your health, fungi and our crops, fungi and the things you use, fungi and the conquest of space. Mushrooms, truffles, mold-made flavors, yeast and mold fermentations, fungi as a future food source, fungus diseases of man, other animals and plants, antibiotics, and hallucinogenic fungi are given special attention. In no other book can such diverse and up-to-the-minute information be found. The reader should be cautioned about accepting some of the information as proven fact. Errors of interpretation are frequent. Nonetheless as a layman's introduction to the fungi and their importance to mankind, the book can be recommended.

CLARK T. ROGERSON

WITH EVERY BREATH YOU TAKE. Lewis, Howard R. 322 pages, illustrated, indexed. Crown Publishers, Inc., New York. 1965. $5.00.

Here is a most timely book on a subject that should be of interest to everyone who lives in urban communities. Well-written and factual, it covers all phases of the air pollution problem. As a victim of chronic bronchitis, and an investigator of air pollution effects on plants for many, many years, I can recommend this book very highly.

P. P. PIRONE

COMMON FLESHY FUNGI. Christensen, Clyde M. 237 pages, illustrated, indexed. Burgess Publishing Co., Minneapolis. 1965. $3.75.

This is the third edition of a popular primer for mushroom identification. The introductory material with diagrammatic sketches of major structures, the keys with drawings illustrating salient features, and the descriptions are essentially the same as in the 1955 edition. One family, the *Thelephoraceae* with twenty representatives, has been added. The major modification is the inclusion of black-and-white photographs for most of the species. Some of these are excellent, but many are inferior and will be of doubtful aid in identification. Colored photographs of nine fungi occur on the outside covers; they are not identified. The book is spirally bound and is of a handy size to carry in the field. For beginners in mushroom identification the book may prove useful.

CLARK T. ROGERSON

QUANTITATIVE AND DYNAMIC ECOLOGY. Kershaw, Kenneth A. 183 pages, illustrated, indexed. American Elsevier Publishing Co. Inc., New York. 1964. $5.00.

This book provides a most satisfactory outline of modern views in ecology. What might

be described as the purely ecological aspects of the book are set out clearly and concisely in chapters on methods of description of vegetation, vegetational succession, and the causal factors of pattern.

Mathematical discussion in the book provides an introduction to the use of traditional statistical methods in ecology and assumes only a minimal previous exposure to statistical terminology in the reader. An account is also provided of objective methods of classification of vegetation using electronic computors. The only criticism which might be advanced of the mathematical content of the book is that with a title embodying so general a word as "Quantitative," it is a pity that no space was given to consideration of the possible application of recent mathematical techniques with a non-statistical basis.

The book is well illustrated with figures and line drawings, and has ample references to more detailed texts. The use of transparent overlays is particularly effective. It should prove an excellent college text for a modern course in ecology. R. C. JANCEY

BROMELIADS, THE COLORFUL HOUSE PLANTS. Kramer, Jack. 113 pages, illustrated (part color), indexed. Van Nostrand Co., Princeton, New Jersey. 1965. $5.95.

Although the press release on *Bromeliads, The Colorful House Plants* claims that no book has been published on bromeliads in the English language since 1889, according to the British Museum Natural History Botanical Library, this is not the case.

It would appear that the author does not have the extensive experience and knowledge one should have in writing a book about bromeliads. The ten pages of plant listings are more or less repetitious, most of the plants being mentioned in the descriptive chapter of one hundred colorful bromeliads. Some of the colored illustrations and drawings are poor; for instance, a color-photo of *Aechmea fasciata* has lost all details to the point that the beauty of this jewel is not visible. Few would recognize *Wittrockia superba* from the drawing on page 22. This is true also for *Bromelia balansae;* anyone who knows this Central and South American hedge-plant will hardly recognize it from the drawing on page 10.

After glancing at the reference chart, this reviewer questions the flower descriptions for *Billbergia venezuelana, B. pyramidalis* var. *concolor,* and *B. zebrina.* WALTER SINGER

BRIEF NOTES ON RECENT BOOKS

FLOWERS

AMERICAN ROSE ANNUAL. 250 pages, illustrated (part color), indexed. American Rose Society, 4048 Roselea Place, Columbus, Ohio, 43214. 1965. $4.50 (or membership $5.50, which includes the Annual and the American Rose Magazine).

The 1965 edition of the *American Rose Annual* furnishes reliable information on the culture of roses, on old roses, and on new varieties. The "Proof of the Pudding" sets forth candid comments on the performance of roses in gardens throughout the country.

THE IRIS SPECIES OF RUMANIA. Prodan, Julius. 69 pages and inserts and appendix and agenda. Median Iris Society, Donald Tufts, 73 North St., Grafton, Mass., 01519. 1964 (rec'd April, 1965).

This translation of Prodan's paper was done by Eva Undritz, a student at the State University of New York at Albany; edited by Dr. Katherine Heinig; and published by The Median Iris Society at the suggestion of Dr. L. F. Randolph.

GARDENING

A GARDEN FULL OF FLOWERS. Smith, Nancy Ruzicka. 241 pages, illustrated, indexed. Charles Scribner's Sons, New York. 1965. $5.95.

From her own personal experiences and enjoyment in gardening, the author provides suburban home owners with the very information they need in planning for and maintaining a succession of colorful flowers from spring bulbs to chrysanthemums in late fall. The format of this book is pleasing too.

GARDENING BY THE SEA FROM COAST TO COAST. Foley, Daniel J. 285 pages, illustrated (part color), indexed. Chilton Books, Philadelphia. 1965. $6.95.

This is an informative book, with well-chosen photographs to illustrate seaside gardens and appropriate plants. However, the emphasis is on the East Coast. There is excellent coverage of this region both in text and illustrations, but the information for mild winter areas in the Southeast and on the Pacific Coast could have been strengthened.

MISCELLANY

ESSAYS ON CROP PLANT EVOLUTION. Hutchinson, Sir Joseph (ed.). 204 pages, illustrated, indexed. Cambridge University Press, New York. 1965. $9.50.

Lectures given by teachers and researchers who have studied agricultural history and the evolution of domesticated or crop plants form the basis of these eight essays on "The Evolution of Maize," "The Development of the Cultivated Sorghums," "The History and Relationship of Cultivated Potatoes," "The Evolution of Forage Grasses and Legumes," etc.

INSECTS FROM CLOSE UP. Photos by Harry F. Brevoort, text by Eleanor I. Fanning. 150 pages, illustrated, indexed. Thomas Y. Crowell, New York. 1965. $6.95.

A well-known nature photographer and a natural science teacher and author have combined their talents in this informative book on familiar insects—bees, beetles, butterflies, caterpillars, grasshoppers, moths, spiders, termites, and so on. The black and white photographs are good, the text well written.

HOW TO BUILD PATIO ROOFS, A SUNSET BOOK. 96 pages, illustrated. Lane Book Company, Menlo Park, California. 1964. $1.95.

This contains ideas on designing and constructing patio roofs of all types and covers

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roofing materials — plastic, canvas, aluminum, redwood, reed bamboo—and lists vines which have been successfully used as patio roof covering.

THE RICE BLAST DISEASE. International Rice Research Institute. 507 pages, illustrated, indexed, bibliography. The John Hopkins Press, Baltimore. 1965. $15.00.

Because the rice blast disease is one of the most destructive factors in the production of rice—the crop upon which about half of the world depends as its chief food, the International Rice Research Institute sponsored a symposium to review the status of research on the disease, its nature and causes, its prevention and control. This volume comprises the proceedings of the symposium held in 1963.

HOPS: BOTANY, CULTIVATION AND UTILIZATION. Burgess, A. H. 300 pages, illustrated, indexed (author and subject). John Wiley & Sons, Inc., New York. 1965. $15.00.

Dr. Burgess has assembled material from many periodicals and combined it with his own lifelong experience and knowledge of hops into a comprehensive and up-to-date book. One of the World Crops Books under the editorship of Professor Nicholas Polunin.

PLANT ANATOMY. Esau, Katherine. 767 pages, illustrated, indexed (author and subject). John Wiley & Sons, Inc., New York. 1965. $14.50.

When the first edition of this book was published in 1953, Dr. William C. Steere, then of Stanford University, wrote, "This is certainly the finest text and reference work on plant anatomy yet to appear in this country ." In the intervening years, research has modified viewpoints in certain aspects of plant anatomy and in the factors governing growth and organization in plants. The text of the second edition of *Plant Anatomy* has been revised to reflect these developments.

A NEW DICTIONARY OF BIRDS. Thomson, Sir A. Landsborough (ed.). 928 pages, illustrated (part color), indexed (generic names). McGraw Hill Book Co., New York. 1964 (rec'd 1965). $17.50.

The editor is dean of British ornithologists, the contributors are internationally known authorities in ornithology. Among Americans who participated in the preparation of the most comprehensive work on birds ever published are Sidney Dillon Ripley, Dean Amadon, Kenneth Carroll Parks, and Ralph Simon Parker.

A New Dictionary of Birds is not only indispensable to the professional, but amateurs in ornithology and any one interested in natural history will want to add it to his library.

TREES FOR NEW JERSEY STREETS. 50 pages, illustrated, indexed. New Jersey Federation of Shade Tree Commissions, Blake Hall, College Agriculture, Rutgers The State University, New Brunswick, N. J. 1965. $1.00. (Special rates for students in bulk orders.)

This is a revision of the publication which made its initial appearance in 1927. While intended "as a guide for those who have the responsibility of selecting tree species for municipal street planting," owners of urban and suburban properties will find much of the contents interesting and helpful—for example, the concise description of trees under such headings as "Fastigrate," "Columnar," "Narrow Conical," "Broad Oval," "Globe-shaped," "Spreading Branched," "Vase Shaped," and the pen and ink sketches illustrating these types; also the lists of trees which tolerate poor drainage, or withstand drought, or perform best in acid soil, or are suitable for planting near the shore.

MUSEUM, U. S. A.—A HISTORY AND GUIDE. Katz, Herbert and Marjorie. 395 pages, illustrated, indexed, bibliography, appendix. Doubleday & Co., New York. 1965. $6.50.

This is the first laymans guide to America's museums, tracing their development and furnishing interesting historical and anecdotal material on the art, science, history, and other collections to be found in these institutions. The appendix lists, and briefly describes, more than twenty-five hundred museums by state and city for ready reference.

FLORA OF THE BRITISH ISLES ILLUSTRATIONS, Park IV. Clahpam, A. R., T. G. Tutin, and E. F. Warburg. 119 pages, illustrated, indexed. Cambridge University Press, New York. 1965. $7.00.

Part IV, illustrating the monocotyledons completes the set. The artist, Sybil J. Roles, drew the nearly two thousand plants from living specimens, using a "kind of freehand sketching technique which is very different from the meticulous, large-scale drawing with which botanists are familiar." "The intention is to provide a visual impression" to accompany the technical descriptions in *Flora of the British Isles*, second edition.

THESE SIMPLE THINGS. House and Garden, Essays From. 126 pages. Simon & Schuster, New York. 1965. $3.00.

Eleven essays on the "Small Joys in Daily Life" from *House and Garden*, whose editor "commissioned some of the finest contemporary writers in English" . . . "to set down the thoughts and emotions stirred by the [things] that go so often unseen, unvalued, unenjoyed." Joseph Wood Krutch's contribution is on "Grass."

THE SUGAR CANE. Barnes, A. C. 456 pages, illustrated, indexed. John Wiley & Sons, Inc. New York. 1965. $15.00.

The history of sugar cane as a world crop, the botany of *Saccharum officinarum* as it relates to the production of a high-quality raw material, growing, harvesting, processing, research—all are covered by the author who had twenty-five years of agricultural experience and now, retired, serves as consultant for many large firms and organizations.

This is the eleventh of the World Crop Series of which the general editor is Professor Nicholas Polunin; each volume is fully documented and profusely illustrated.

U.S.D.A. Publications for Gardeners. *Indoor Garden for Decorative Plants*, a publication of the United States Department of Agriculture, tells how to use an indoor planter designed by the U.S.D.A., how it should be wired, how to plant it, and how to care for the plants. The publication lists twenty-seven plants and the amount of foot-candles of light needed by each. The planter, which can be made of fir plywood painted to match the walls of a room, or of veneer plywood stained or oiled to match the furniture, requires a water-proof liner.

Iron Deficiency in Plants: How to Control it in Yards and Gardens is another recent publication issued by the United States Department of Agriculture of interest to gardeners. Prepared by soil scientists in the Agricultural Research Service, it describes symptoms, causes, and correction of iron chloroses resulting from iron deficiency. This condition may occur anywhere in this country but is most prevalent where the soil is high in lime or poorly drained, as is found in some sections of the Southeastern States and especially in the Western States.

Both these publications may be obtained free on a postcard request addressed to the Office of Information, United States Department of Agriculture, Washington, D. C. 20250.

LETTERS TO THE EDITOR

I have just read your article on wild flowers ["Wild Flowers en Masse" by Marjorie G. Schmidt] in the May-June issue of *The Garden Journal*. One sentence prompted me to write you. "Wild flowers en masse is a phenomenon which does not occur frequently in our modern world," . . and, of course, you are right. But . have [you] ever seen the wonder of the Swiss meadows? Not to mention the alpine flowers and flowers of the woods . . . Here in Switzerland, the incomparable fields blaze with color, the variety is immense. One can stand without moving the feet and within arms length gather twenty varieties. But one does not trespass *in* the grass when it is growing like this—there are always paths or cart tracks because the grass is precious to the farmer, who cuts it many times in the year for fresh green fodder as well as hay. After each cutting additional new varieties of flowers spring up . ."

Mrs. John Born
Zumikon, Switzerland

The article on day-lilies as food [by Shiuying Hu] arrived early enough to tempt me to eat them this summer. The gold varieties with fragrance and substance make the best salads and hold up well in cooking.

Gordon Blackwell
Tuckahoe, N. Y.

It has been called to my attention by Rupert C. Barneby that dragoness plant, one of the early common names for *Clintonia borealis* (*The Garden Journal*, July-August, 1965, pp. 147-149) is not at all mysterious, but rather the translation of the former generic name *Dracaena*, the Greek *drakaina* being *she-dragon*.

Mr. Barneby also remarked that Gawl to whom I referred, is, in fact, Ker Bellenden; that is, he had his name of John Gawler changed by Royal Permission to Ker Bellenden on November 5, 1804, used it as Bellenden Ker, then in later life adopted the name Ker-Gawler. He contributed text to illustrations in such works as the *Botanical Register* and seems to have been an expert on American plants.

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THE GARDEN JOURNAL

THE NEW YORK BOTANICAL GARDEN

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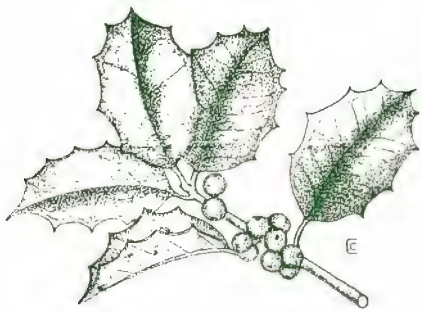

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THE GARDEN JOURNAL

DOROTHY EBEL HANSELL, *Editor*

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The garden of yesteryears roses at Hodges Garden.

ROSES AT HODGES GARDENS

By KITTY M. SIMPSON

Mrs. Simpson of Shreveport, Louisiana, recognized as an authority on old roses, has been a member of the American Rose Society for many years and is presently a member of its Old Rose Committee. Her enthusiam for old roses prompted A. J. Hodges to add a special garden at Hodges Gardens, which now contains one of the largest collections of these roses to be found anywhere. Mrs. Simpson is also a member of a number of other horticultural societies and the Southern Field Editor of *Better Homes and Gardens.*

AMONG THE ROLLING HILLS of northwestern Louisiana, Hodges Gardens, comprising forty-seven hundred acres, is located in Sabine Parish and Kisachie Forest—amidst rocks and rills, for it was once an old stone quarry. There are miles of cascades and several waterfalls, tumbling to pools below where the finest water-lilies bloom from early summer until frost. In all this vast garden one is seldom out of sight or sound of water. Cascades run through flower beds and around giant longleaf pines to the two-hundred-and twenty-five-acre lake where wild ducks and geese make their permanent home. Since this huge garden is fenced and protected, all the shy little woodland creatures can live their lives there, unharried and happy. Many kinds of birds sing in chorus with the rippling cascades and sighing of the tall pine trees. One wonders what will become of the woods animals and birds, if tracts of land are not preserved. All are happy here at Hodges Gardens from the deer in their park down to the little chameleons catching bugs among the flowers. In the natural woodland area where grow native azaleas, tall enough so that one may stand beneath them, a creek runs, singing, over age-old mossy stones. The songs of thrushes mix with the call of quail, raising their young among large native ferns.

Broad walks lead to many parts of the garden, sometimes high over beautifully planted ravines, where many-hued flowers bloom.

There are three rose gardens. One is a large garden of aristocratic modern roses in which the beds are well outlined, and the roses, properly labeled, perform as hybrid teas, floribundas, and grandifloras should, bearing high-pointed classic blooms with not a petal out of place. Each bed has its own particular color, the beds being so arranged that the colors do not clash. When seen from above at the rose pavilion, they resemble the pattern of a lovely oriental rug.

Another garden, known as "the point rose garden," is planted in raised tiers along the curves of the lake, where one may walk enjoying the blue of the lake on one side and the colors of the roses on the other. Here are beds of twenty-five each of test roses, either neatly labeled with name or with the grower's number. 'John F. Kennedy' and 'Matterhorn' in their pristine white beauty hold up enormous

blooms for admiration. Coral 'Tropicana' grows near the multicolored 'Joseph's Coat', while 'Greenfire' glows with that peculiar yellow which no other rose I know possesses. This rose is hard to find. Many other roses delight the eyes. Here, too, are beds of the older polyanthas, a class which unfortunately seems to be dying; and it should not, for there is a place in every garden for these small bushes in such varieties as golden-salmon 'Ideal' and 'Chatillon'. They are pretty, floriferous, and useful for edging large rose beds and for furnishing color in the landscape. In several beds there are giant tea roses; the thornless 'Mrs. Dudley Cross' (1907) whose blooms are so variable it is difficult to find two alike—they are large, double, and pale yellow rimmed with pink, or all pink, or they may be yellow with the outer petals dotted with pink; and 'Mrs. B. R. Cant' (1901) which produces double, cupped, and often quartered blooms of soft, rosy pink on stout stems. These bushes, almost tree-size, are high enough for a child to stand beneath them. On the stone walls at the back are other old roses: the "seven sisters" rose *(R. multiflora platyphylla)* which bears in early spring heavy trusses of small, double roses shaded from pale pink to crimson; and 'Crimson Rambler', said to have been imported from Japan to the United States in 1895, which has dollar-size, double, bright red blooms in early spring. It was called the "engineers rose." 'American Pillar' is happy on the stone walls, too. This rose garden, bridging the modern roses in one garden and the old roses in the other, is a lesson in the progress of the rose.

The garden of yesteryears roses can be reached from the lake side by steps or from the side of the main garden by passing the gift shop and a sparkling fountain. At each end there are mounds of chinquapin or burr rose bushes (*R. roxburghi plena,* 1825) which bloom heavily in spring and enough all season to be interesting. The two-tone pink, double flowers, three inches across, emerge from soft prickly buds and even the hips are bristly. While it grows to four or five feet high, I have seen bushes which were twelve feet across. The foliage is small, the bark gray. An old plant sheds bark in winter like an old crape-myrtle or sycamore tree. Entering the large oval, entirely surrounded with tall redwood lattice, one is treated to a view of the past. The lattice is completely covered with "running roses," and as one walks beneath them, petals of 'Marechal Neil' ('Noisette', 1864) with their sweet scent, or of other old climbers, may fall upon one's head. This garden of old roses can be enjoyed from afar, for almost all the roses are intensely perfumed. It crowns a hilltop, and the fragrances of magnolias, gardenias, and jasmines are wafted up by every breeze to mingle with the rose odors. While the modern roses were planted with color in mind, these old roses had to be planted according to the size they would grow, low bushes in the front of the beds and taller bushes in the background; yet in some strange fashion their colors blend and do not clash. Perhaps old roses know "That Nature knows no color scheme." Some of the bushes which were not supposed to grow more than four feet tall, such as the lovely large, quartered, flat, flesh-pink 'Souvenir de la Malmaison' (Bourbon, 1843) grows almost seven feet tall and flaunts perfumed blooms all season. Walter Chelupnik, Chief Horticulturist, and I agree that this is the finest rose for southern growing. The largest rose is 'Paul Neyron' (hybrid perpetual, 1869); it is also the most freely blooming of the hybrid perpetual group. 'Paul Neyron' is a pleasant thornless rose with long stems and flowers of a lively pink with a whisper of violet in a cupped form sometimes seven inches across. One does not have to stoop to smell this rose, for it grows head high.

Old roses are different in form of plant, in foliage, and in growing habits. Some, such as 'Sombreuil' (climbing tea, 1851) with large, flat, creamy white blooms, have their petals as perfectly placed as the feathers on a bird's breast, as Dorothy Stemler of Tillotson's Roses once said. I can attest to this, for my pet quail, Rebecca, sits on my desk and shows her perfect little breast while playing with pencils. Others, like 'LaReine Victoria' (Bourbon, 1872) are cupped, tulip fashion. This variety grows to eight feet and bears rosy pink flowers exactly right for grandmother's old vase.

The chinquapin or burr rose, *Rosa roxburghii plena,* flowers abundantly.

'La Reine Victoria', an old Bourbon rose.

Rose 'Souvenir de Malmaison' combined with native pink azaleas in a pressed-glass bowl.

'Paul Neyron', a fine hybrid perpetual rose.

'Sombreuil', a climbing tea rose perfect in form.

'Mrs. Dudley Cross', an old tea rose variable in color.

Leda, or the painted Damask rose, is displayed in an ironstone pitcher.

Some of the old roses bloom only in spring, but they bloom for more than a six-week period. 'Leda', or the painted Damask which was known prior to 1827, is one of these. The bush is five feet tall, and the many exquisite small-petaled blooms are two inches across. In color 'Leda' is pale pink, and the edges look as if they had been dipped in red wine. There are hundreds of old roses in this garden, blooming from mid-March until almost Christmas, depending upon the vagaries of the weather. The rose season always overlaps the blooming season of the camellias. Tea roses bloom all season, for they love the warm Louisiana sun. The peak of bloom occurs the latter part of April and May, with the modern roses putting on their show close behind. Autumn sees all the roses at their finest colors.

While the other rose gardens are orderly, the old rose garden is not. These rampant old beauties throw out long canes in every direction, and because they resent pruning, it is difficult to keep them in bounds. So they are allowed to have their way like beautiful, strong-minded children, and we love and enjoy them. At each end there are comfortable chairs under shelter, for the old rose garden is for meandering among old rose friends or for sitting and listening to the mockingbirds which nest here; for grandparents to rest with their grandchildren who mirate at the striped roses or 'Archduke Charles' (China, about 1840) whose double blooms may be pink or red, or half and half or mottled, and intensely fragrant, or at the great bushes of *mutabilis (R. chinensis)* covered with single, two-inch blooms of yellow, pink, or red—they open yellow and change colors daily. The fluttering flowers look like gay butterflies adorning the bush. Old roses, which bring back happy memories, are beautiful, vigorous, and healthy. Years ago, when I first started collecting them, I found many growing in almost impossible locations, without care which is what probably saved them from extinction. With loving care they flourish, as witnessed here at Hodges Gardens in their growth and prolific bloom. All the roses are regularly fed and sprayed, although the old roses are most disease-resistant. I have some in my own garden twenty-five years old which have never been sprayed. All the beds are mulched with pinestraw, which Editor Mrs. Hansell might change to pine needles—but down South we say pinestraw.

Located on U. S. Highway 171 midway between Leesville and Many, Louisiana, Hodges Gardens is owned and operated by the non-profit A. J. and Nona Trigg Hodges Foundation, which is dedicated to conservation and cultural projects. The gates are open from 8 a.m. to sunset daily, the year around.

THE GENESIS OF THE RHODODENDRON SPECIES FOUNDATION

By MILTON V. WALKER

Dr. Walker is a physician, former Director of the American Rhododendron Society and now President of the Rhododendron Species Foundation. The following is based on his address before the annual meeting of the American Rhododendron Society held at Planting Fields, Oyster Bay, May, 1965.

LET ME FIRST DIRECT YOUR THINKING to a group of men to whom we owe a debt of gratitude—the plant explorers who brought from Asia those species we now enjoy and without which we would not have our splendid hybrids.

Hybridization of rhododendrons started only 139 years ago with the blooming of that spectacular blood-red *R. arboreum,* which had been introduced from India fifteen years previously. Plant exploration commenced in earnest with Sir Joseph Hooker who, beginning in 1847, pioneered a hundred years of exploration which gave us most of the rhododendrons we are growing today. Among Hooker's introductions are some of the finest, such as *R. thomsonii* and *R. falconeri.* Fine old patriarchs from Hooker seeds, growing at Stonefield in the west of Scotland and at Rhu near Glasgow, are sights long to be remembered.

E. H. Wilson pioneered a new period in plant exploration which resulted in the astounding discovery by him and his contempories, Forrest, Farrer, Rock, and Kingdon-Ward, of more than six hundred new species in the first forty years of the twentieth century. Unfortunately, both Farrer and Forrest died in the field.

Our debt to these men has been very graphically pointed out by David Leach in his book *Rhododendrons of the World* in which he writes, "The journeys of the plant explorers into the mountain wildernesses of India, Burma, Tibet, and China were high adventure of courage and endurance, of disappointment and discovery, of exalted experience and overwhelming disaster."

I am glad the fine tradition established by the early plant explorers is being carried on today by Peter and Patricia Cox and their friend P. C. Hutchison, who are now collecting in Bhutan, and by Francis DeVos in Nepal.

Travel in the mountainous regions of Asia was arduous and dangerous fifty to sixty years ago, and it took financial backing to undertake an expedition then as it does today. Let us think for a moment of those who financed the intrepid explorers with their own money. At first there were such individuals as Veitch and Sons and Arthur K. Bulley, founder of Ness Gardens. Later, as the costs increased, there were syndicates composed of larger numbers of contributors. Mr. Bulley alone financed George Forrest's first two expeditions and was also a member of each syndicate financing his last five expeditions.

Who grew all the seeds sent back by these plant explorers—probably thousands of packets of seeds in the course

of just a few years? We know that in a ten-year span no fewer than 312 new species were discovered. J. B. Stevenson, of Towercourt, and his wife were among those who not only backed the plant explorers financially, but grew seeds from probably every one of the expeditions. Euan Cox wrote me that this enormous influx of seeds between 1922 and 1938 was "handled like an efficient business concern. Jac Stevenson, as it were, ran the office, keeping a very careful record in what came to be a dozen or so notebooks . . . Mrs. Stevenson undertook the practical work, sowing every seed, and did most of the pricking out and ultimate planting in the nursery bed."

Last spring I sat on a bench in the garden of General and Mrs. Harrison (the former Mrs. Stevenson) while she told me it was her daily job, after Mr. Stevenson went to the office, to transplant two hundred and fifty seedlings from each batch of numbered seeds. Later I wrote Mrs. Harrison for more information about Towercourt and was amazed to find from the records that she had evidently sowed and cared for a total of 2,942 packets of rhododendron seeds. The amount of work is staggering to the imagination. The bookwork to keep the records straight was in itself no small job. As the seedlings grew, there was the problem of selecting, discarding, and finally describing the new species as they came into bloom. The plants in the Stevenson collection at Towercourt made possible, in large measure, the descriptions of the species in the first *Rhododendron Handbook.*

A few years ago when Dr. Carl H. Phetteplace was vising Mrs. Stevenson, she expressed her concern over the loss of carefully selected forms of the species, because of the breaking up of fine collections in private gardens. She pointed out the confusion that was becoming worse each year with the growing of multitudes of open-pollinated seedlings under species labels (when, in the main, they were hybrids and not true forms of the species). Mrs. Stevenson predicted utter chaos in twenty-five years, unless something was done soon to preserve and propagate the true forms. This comment, made by such a respected and knowledgeable woman, led first to the Species Project of the American Rhododendron Society, then this past year to the Rhododendron Species Foundation under which there is now taking shape, in America, a collection of authenticated forms of the species of *Rhododendron.*

For more than three years, groups of people working on the Species Project have visited gardens on the West Coast, seeking to locate good forms of the species. Thus we have formed a much better idea as to what forms are truly representative of the species—many of the forms were poor and possibly not true forms at all. The most unfortunate aspect of our finding was the realization of the many years of wasted effort in bringing into bloom inferior plants from open-pollinated parents, when in Great Britain there were hundreds of true species of remarkable beauty whose owners were quite willing to share them with us.

While on a European trip two years ago, I went to see the part of the Stevenson collection of species that had been moved to Windsor Great Park. Although I had read about it in Lanning Roper's excellent book, I was not prepared for the magnitude of the collection, the size of the plants, and the number of different forms of each species . . . How wonderful it would be, I thought, if we could have a collection like this in the States, if we could get cuttings and cions. Discreet inquiries revealed that it might indeed be possible and after considerable correspondence, a meeting was arranged with Sir Eric Savill.

Mrs. Walker and I were invited to have lunch with Sir Eric at his home in Windsor Great Park . . . After lunch we had about an hour's discussion of the Species Project in which Sir Eric displayed a very real interest and about which he seemed to be informed. Suddenly he turned to me and said, "Dr. Walker, you may have anything we have—anything." After a pause, he added, "You would, of course, be foolish to take anything and everything, because we have a lot of poor things here, and you ought to have only the best for your collection. The private gardens of Britain have many fine forms which you should also have. I suggest that you come back next spring during the blooming season and spend two to three months visiting private gardens and selecting the best forms for your collection."

The winter after this conversation with Sir Eric was spent in reading about British gardens and in trying to figure out how we could accept the wonderful opportunity offered. By spring I had notes on over sixty rhododendron gardens in Great Britain, at least twice as many as it would be possible to visit. How was I to know that the species described in the literature were true forms? I should certainly require the assistance of authorities like Hope Findlay of Windsor and Mr. Davidian of Edinburgh. Suppose these people were good enough to offer to send us cuttings, how were we to get them into the States without preshipment inspection of the parent plants? Sir Eric had told me that such inspection was quite impossible, because of the distances involved in getting inspectors to come from London. Could anything be done to prevent the losses some of us had experienced with entry fumigation? And just supposing we were able to get a sizable number of cuttings in to this country, who could be trusted to propagate them? Who would grow them on for a year or two? Wales Wood and Dr. J. Harold Clarke agreed with me that a way had to be found to get these fine species for the rhododendron buffs in America.

We realized that eventually a permanent garden would have to be established so that these outstanding forms would never be lost. This would take a great deal of money. Someone suggested a non-profit corporation, a foundation which would be able to receive tax-exempt gifts. Wales Wood, who is an attorney, went to work on this angle while Mrs. Walker and I traveled to Great Britain last spring.

With the help of Sir Eric Savill and Mr. Findlay from Windsor, Dr. Harold Fletcher and Mr. Davidian from Edinburgh, and Patrick Synge, Editor of the Royal Horticultural Society, we were able to visit thirty private gardens and several large nurseries. We also spent many days studying the plants at Windsor, Wisley, and the Royal Botanical Garden in Edinburgh. We traveled over three thousand miles by car, and what seemed like thirty thousand miles by foot, as well as traveling by train and boat as we crisscrossed all Britain and Ireland during a visit that extended for two and a half months. A list of what were considered

the best forms in each garden was compiled, and then this list was checked by Mr. Findlay and Mr. Davidian; it is from this list that we have requested 322 different species or forms for our Foundation Collection. The University of British Columbia through Leon Koerner, a very generous benefactor, offered to receive and propagate any of the species . . . and even agreed to grow on for a period of two years the propagated plants and to forward them at any time to any destination. All the University asked in return was the privilege of keeping one plant of each species to establish a Canadian Species Garden; it will assume the complete financial responsibility for the garden.

The immigration regulations between Canada and the United States are such that we anticipate no difficulty in bringing these plants into this country as soon as we have a place for them.

The Rhododendron Species Foundation

Mr. Wood drew up the Articles of Incorporation and in June, 1964, a non-profit corporation to be known as the Rhododendron Species Foundation was registered with the Corporation Commissioner of the State of Oregon . . . It was agreed that the Species Foundation should complement and extend the functions of the American Rhododren Society, and in no way be in conflict. It should not be responsible to the Society and likewise the Society should not be responsible financially or otherwise for the Species Foundation.

We felt that a large membership with dues and yearly fund-raising activities was not indicated and that the objectives could be well served by a carefully chosen Board of Directors . . . We realized that we had to have a core of directors living in the Northwest, but wanted all sections of the United States and possibly Canada represented, and the American Rhododendron Society fully represented on the Board but not overweighing it. The Foundation needs men who can, by personal contribution or by influence, help in raising the endowment of a million dollars considered necessary to the successful achievement of the objectives. The success of the Foundation depends on having men on the Board of Directors who are of national stature in horticulture and business, and willing to give liberally of their time and substance. Among those serving on the Founding Board of Directors are: Milton V. Walker, M.D., Creswell, Oregon, President; Sir Eric Savill, Crown Estate Office, The Great Park, Windsor, Berkshire, England, Honorary Vice President and Director; Wales Wood, St. Helens, Oregon, Vice President; Fred M. Robbins, Puyallup, Washington, Secretary; Clarence A. Chase, Eugene, Oregon, Treasurer; Mrs. Prentice Bloedel, Bainbridge Island, Washington; Dr. J. Harold Clarke, Long Beach, Washington; Edward B. Dunn, Seattle, Washington; Henry F. duPont, Winterthur, Delaware; Dr. H. B. Hawthorn, Chairman of the Department of Anthropology and Sociology, University of British Columbia, Vancouver, Canada; Mrs. Henry Issacson, The Highlands, Seattle, Washington; Dr. Gordon E. Jones, Director, Planting Fields Arboretum, Oyster Bay, New York; David G. Leach, Brookville, Pennsylvania; Mrs. Pendelton Miller, The Highlands, Seattle, Washington; Dr. Henry Skinner, Director, United States National Arboretum, Washington, D.C.; Cecil C. Smith, Aurora, Oregon; and Dr. John C. Wister, Director, Arthur Hoyt Scott Horticultural Foundation, Swarthmore College, Swarthmore, Pennsylvania.

A large central or main garden located either in Oregon or Washington seems climatically best suited for the greatest number of species and has priority in our planning. Subsidiary gardens are planned to exhibit species suitable for particular climates and to maintain stock plants for propagation which will probably be carried on at the main garden. Subsidiary gardens have been suggested for Cancouver, B. C., San Francisco Bay area, and the California or southern Oregon Coast for the more tender varieties and the large-leaved species; Hamilton, Ontario, Long Island, New York, Pennsylvania, and perhaps North Carolina for species suitable for those particular climates. These subsidiary gardens would not be owned by the Foundation, but would be located at and maintained by botanic gardens or other institutions under special arrangements.

Each garden, located as conveniently as possible to a population center, should exhibit true forms of the species suitable for that particular climate, and these species should be accurately named and provide comparative standards for study. The gardens, primarily for study and research, and definitely not display gardens, will be of inestimable help to hybridizers as a source of pollen. Many have found it difficult to be sure of the parentage of the plants they are using in their planned programs of hybridization. Large-scale propagation facilities and possibly a meristematic culture laboratory will have to be set up at the main garden. We hope the scientific activities of the Foundation will not only encompass research in propagation techniques, but also in identification and reclassification of the species in their series, as is now carried out at the Royal Botanical Garden in Edinburgh. Permissible limits of variation in the different species and the many questions concerning natural hydridity are intriguing lines of research. In order to aid the Foundation in its scientific activities, it would be advisable to provide specialized training in the genus *Rhododendron* to otherwise qualified botanists, and to provide a start in this training we must find an adequately trained taxonomist.

The immediate problem is to finance the purchase of property suitable for the Foundation's main garden. In two years at the very most, we must have a place prepared for our rapidly enlarging collection of species. I should like to point out that the project undertaken by the Foundation is definitely not a West Coast one, not even a national one, but international in its scope. Dr. Harold Fletcher, Regius Keeper of the Royal Botanic Garden, sent me copy of a paper he had written for the International Association of Botanic Gardens and Arboretums, and read during the Tenth International Botanical Congress held in Edinburgh in August of last year.

In the opening paragraph of this paper Dr. Fletcher said, "If accurately named living plants are to be found anywhere, they ought to be found in botanic gardens. Yet it is clear that the percentage of wrongly named plants growing in botanic gardens is high. Even so, seeds from these plants are distributed to botanic gardens and horticultural establishments—seeds, moreover, from incorrectly named plants which have been openly pollinated. . . . Thus for ages,

(Continued on page 251)

PROTECTED BY POISON

By Lucia M. Andrews

Mrs. Andrews, who was a student in Botany I and II under Dr. H. W. Rickett at The New York Botanical Garden and in other courses in the Garden's Educational Program, continued her studies and received a Master's degree from Columbia University under Dr. Bassett Maguire. She is now engaged in writing on botanical topics.

Joyce Kilmer has stated in memorable words that "only God can make a tree," but I lived for a while in the shadow of a tree so weird and fascinating and dangerous that it seemed a creation of the devil.

It was on the island of Tobago, which lies nearly thirty miles northeast of Trinidad, about eight hundred miles north of the equator, that I first made the acquaintance of this strange tropical tree. A steep bank fell away from my little house to the rocky shore some forty feet below, and at the base of the slope grew a large spreading tree, its roots washed by the Atlantic tides.

All day and all night the waves broke ceaselessly on the half-submerged basaltic rocks which had once formed a mountain peak of a prehistoric range. For millions of years the rhythmic strife of wind and water against rock has continued without pause, relentless. Over this small sector of the age-old battle between sea and land, the unfamiliar tree stretched its writhing branches, clothed with broad, dark green, shining leaves, with long petioles like those of our poplar, and bearing fruit which resembled little green apples.

Since most of the branches reached seaward for light, the structure of the body and limbs was clearly exposed to view from the window of my house. The sturdy, round trunk and thick branches were covered with a smooth bark, the color of an elephant's skin, mottled with a rust-colored fungus in patches like dried blood.

At a point above ground, about a quarter of the total height of the tree, the main trunk divided into three contorted limbs, each approximately two feet thick. These and the smaller branches nearer the crown all twisted upward in sinuous curves, their swollen undulations suggesting muscles and flesh.

A spiny, green thread of a ceriod cactus had found its way up the gray trunk, rooted in a notch, and developed a bundle of stems like a Gorgon's head of snakes. One stem, moving in the breeze, beckoned to me with wicked allure, others clung to the massive trunk with a reptilian embrace.

The tree at once attracted and repelled me. I longed to collect the globular, green fruits, to section and examine them. Those serpentine limbs were tempting a modern Eve to grasp another forbidden apple.

The first morning I asked our West Indian boy, "What is that strange tree beside our cottage?" In soft Bajan dialect, he answered, "Dat is ver' bad. Do not go near or touch. She poison you bad. Watch for another near the beach."

By lunch time I had unpacked my books and was prepared for the attractive young woman who stopped me on the path. "What is that queer tree with the shining apple-like fruits?"

"It's called manchineel—botanically, *Hippomane mancinella* of the *Euphorbiaceae*. All parts of it contain a very poisonous milky juice."

"That explains it," she said, "there's one on the beach. I touched it and for days my hand was red and swollen as if it had been burned."

Some years ago a heavy branch of this manchineel hung over the cottage roof, a hazard in high wind. Mr. Mendes, the owner, hired a laborer and warned him to be very careful when he cut away the branch. In spite of precautions, the poor boy was blinded in one eye for a month by the poisonous exudate of this devil's tree.

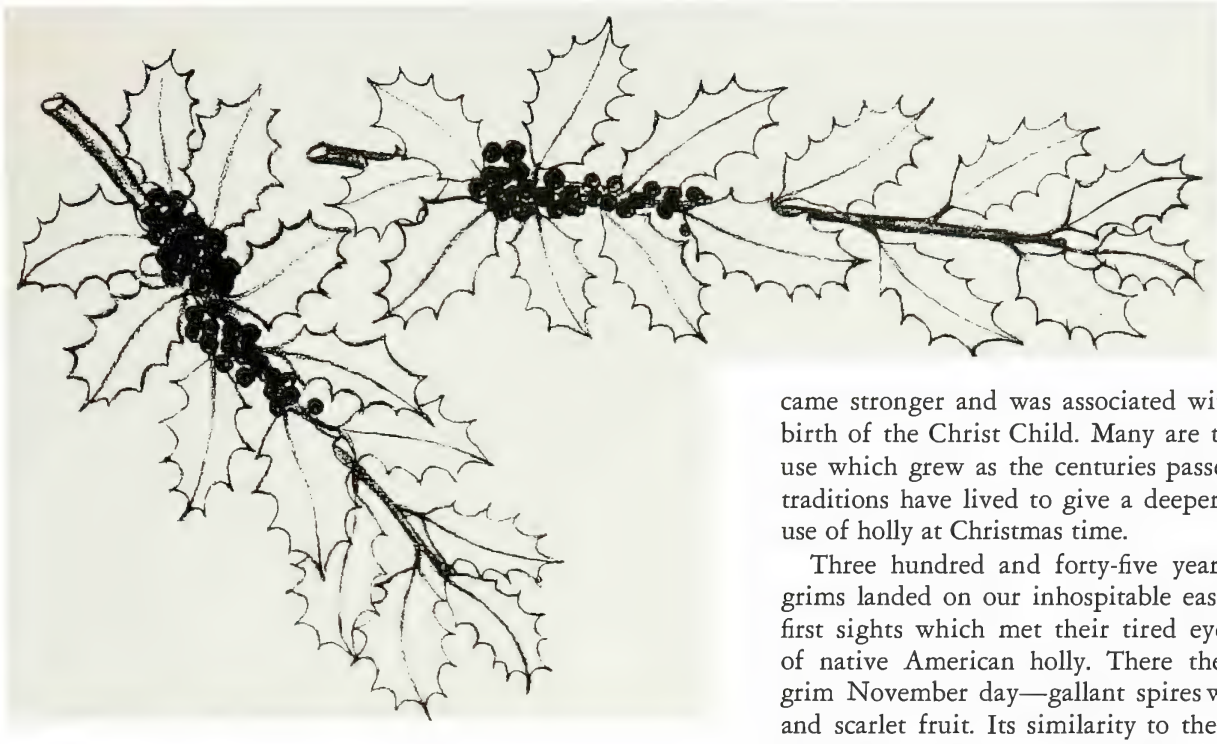
It is not surprising to read that the Caribs, the most warlike of the primitive West Indian tribes, used the sap of manchineel to poison the tips of their arrows.

The difficulty of felling and handling one of these trees is so great that although the wood is hard, has a deep olive-brown color, and a beautiful well-marked grain which makes it highly prized for cabinet work, it is not easy to find a craftsman who will work with it.

To kill a manchineel on the beach at Tobago, it was necessary to keep a fire burning around its base for days, until the bark was completely girdled. Then when the tree was dead, it was left standing for a year or two to become thoroughly dry and weathered. A tedious lumbering operation on a tree which may grow fifty to sixty feet tall and have a diameter of ten feet at breast height!

Manchineel is a littoral species, growing on tropical sandy shores from Florida and Mexico to Venezuela. Its little, green fruits fall into the water, bob with the foam on the crests of the waves, and are carried along the shore by tides and currents. Conceived on land, and borne on the sea, some seeds find favorable niches where they germinate and grow, protected from enemies by their dangerous juice.

Manchineel, *Hippomane mancinella*.



WITH BOUGHS OF HOLLY

IT'S CHRISTMAS and there's holly on the table, holly on the mantel, holly on the door. We make our wreaths and arrangements and light our candles and recall pleasant Christmas thoughts, scarcely aware that we are thus performing rites as old as history itself.

In whatever combination it is used, the holly which we know and associate with Christmas stands out among other greens. Its shiny, spiny leaves and brilliant berries make it unique among plants, and it is small wonder that it has been given special reverence and significance by the people who have lived with it down through the ages. To them it has always symbolized the benign things of life—it has been an expression of good-will and hope, an instrument for foretelling the future, a cure for disease.

There is scarcely a country in Europe without its anthology of holly lore. In classic Greece, where the language of flowers and their arrangement were perfected, a gift of holly, especially if combined with mistletoe, assured the receiver of power to overcome his difficulties. During the boisterous Saturnalia, which took place in Rome in December, gifts of holly boughs were exchanged to express good wishes. Holly was especially favored to accompany gifts to a bride to wish her a future of happiness and prosperity.

To the priestly Druids of ancient England and Gaul, it was all these things plus defense against evil spirits. Conditioned by the severity and mystery of their environment, they were more fearful of the elements and, like other primitive people, attributed their misfortunes to evil spirits or witchcraft. A holly tree near the house was believed to be a safeguard against calamity. Holly branches hung within the house furnished sanctuary, during the winter months, for the friendly woodland spirits.

Most of these beliefs had a religious undercurrent, pagan at first. With the coming of Christianity, this element became stronger and was associated with celebrations of the birth of the Christ Child. Many are the traditions as to its use which grew as the centuries passed, and some of these traditions have lived to give a deeper meaning to our own use of holly at Christmas time.

Three hundred and forty-five years ago, when the Pilgrims landed on our inhospitable eastern coast, one of the first sights which met their tired eyes was the specimens of native American holly. There the trees stood on that grim November day—gallant spires with shiny, green leaves and scarlet fruit. Its similarity to the holly of their homeland surely evoked memories of all the best they had left behind and strengthened their confidence in the building of a new country with concepts of life developed from the old.

These Pilgrims were to learn that the Indians also cherished the holly—to them it was a symbol of courage and victory in war, and they wore it as an emblem on their shirts and shields.

The December scene often features what is known as "Oregon holly." This plant is related to the American holly, *Ilex opaca,* which greeted the Pilgrims in 1620. The so-called Oregon holly is really the English holly, *Ilex aquifolium,* the holly around which the European legends grew. Today it is shipped throughout the East from Oregon, which is confusing since Oregon is a third of the way around the world from England.

How the English holly reached Oregon goes back to the beginning of one of the most romantic periods of American history. The first settlers of the Oregon territory were English fur traders under the protection of the Hudson Bay Company. They went there from England by the only means possible at that time—by sailing ship around the Horn. It was a rugged trip, and for months the traders battled heat and cold, hunger and thirst, seasickness and the savage and capricious gales which are characteristic of the straits of Magellan. They finally attained their goal, setting up extremely lucrative contacts with the local Indians.

Subsequent ships, following the same hazardous route, brought wives and sweethearts and, among other accessories of domesticity, packets of seeds and, so they say, little potted hollies. The wilderness on the western slope of the mountains was like the homeland in its moist air and rich soils, and both settlers and hollies prospered and thrived.

The fur trade has dwindled, but the progeny of those tiny holly pioneers make one of the spectacular attractions of scenic Oregon. Huge specimens, one hundred or more years old, are still to be seen in the Portland area, where acres upon acres of stately trees grow for Christmas enjoyment.

So when we send holly to a friend, it is a gift with a special meaning as it was to the Romans two thousand years ago. When we deck our rooms with holly, we invite all friendly spirits to our home. When we hang holly on our doors, it is more than a thing of beauty—perhaps it will defend us, as it did the Druids, from suspicion and greed and hate.

LARRY LIVINGSTON
Sassafras Farm
Cecilton, Maryland

Above all the natural *Greens* which inrich our homeborn store, there is none certainly to be compar'd to the Agrifolium (or Acuifolium rather) our *Holly,* insomuch as I have often wonder'd at our *curiosity* after forreign Plants, and expensive *difficulties,* to the neglect of the *culture* of this *vulgar,* but *incomparable* tree; whether we will propagate it for *Use* and *Defence,* or for *sight* and *Ornament.*

A Hedge of Holly, Thieves that would invade,
Repulses like a growing *Palizade;*
Whose numerous leaves such *Orient Greens* invest,
As in deep *Winter* do the *Spring* arrest.

Is there under *Heaven* a more glorious and refreshing object of the kind, than an impregnable *Hedge* of *near three hundred foot* in length, *nine foot high,* and *five* in *diameter;* which I can shew in my poor *Gardens* at any time of the year, glitt'ring with its arm'd and vernish'd *leaves?*

JOHN EVELYN

HOLLY IN ARRANGEMENTS

HOLLIES OF DIVERSE HABITS OF GROWTH, which are part of the home landscape planting, will provide foliage for arrangements ranging from the most discriminating artistic "fling" to one suitable for a windowsill in the kitchen. Whatever the style—traditional, contemporary, or the most modern-abstract—holly can be adapted to it.

If you have a nice selection of hollies, you can prune to shape the plants and at the same time obtain a variety of pieces for arrangements. For the most satisfactory results, do your cutting at least twelve hours before you plan to use the holly, making long slanting cuts at the base of the stems or splitting the bases vertically for approximately an inch. Plunge the cut stems into lukewarm water; then place the water-soaking branches in a cool, no-draft location until you are ready to arrange them. (No holly decoration should be on display in the home without the stem being in water or in water-retaining plastic.)

Any containers which are normally in use about your home will hold holly arrangements, provided you use heavy-duty pinholders or chicken wire to keep the branches in position, or you can use plastic, such as "Oasis," in a container which does not hold water. "Oasis" will even serve as a container if reinforced with chicken wire and aluminum foil. You must soak it thoroughly, keeping it under water until it is waterlogged; this usually takes about an hour. Then place the water-soaked "Oasis" on a strip of one-inch floral chicken wire; cut the strip large enough so it can be folded about the plastic. Be careful not to use the plastic as leverage when folding the wire; use your thumb and fingers to bend the wire around the block of plastic, and hook the cut ends into the plastic to prevent the wire from loosening or from pricking your fingers.

Next place the wire-wrapped plastic upon a bed of several folds of waxed paper or aluminum foil; then put this cushioned piece upon a length of foil which is of sufficient size to cover the plastic but not to overlap to any great extent. Much-doubled foil is hard to pierce when you attempt to introduce soft-stemmed flowers in an arrangement.

The foil-wrapped plastic can be put into a shallow container or on a wall plaque, with adhesive tape attaching it in the desired position. Strips of the tape should be stretched across the plastic and attached to the dry edge of the container.

If you want to create candelabra arrangements of holly, you can place wire-wrapped plastic, which is shaped like a doughnut, around candles in epergnettes.

In the accompanying illustration, American holly, *Ilex opaca,* has been used for the vertical line of height and to form the overall triangular effect by being repeated in the outer horizontal lines. Heavily fruited branches of a Burford type of Chinese holly, *Ilex cornuta* 'Burfordii', provides the focal point and depth. A much-spined Chinese holly has been used as a "filler" and to furnish an interesting silhouette.

HENRY P. ORR, Professor
Ornamental Horticulture
Auburn University
Auburn, Alabama

ALOË AGAIN

By GERTRUDE B. FOSTER

Mrs. (Philip) Foster is Editor of *The Herb Grower Magazine.*

Reference to *Aloë ferox* as a burn remedy and as a suntan lotion in "South African Ornamentals for American Plant Connoisseurs" by Russell J. Seibert, *The Garden Journal,* March-April, 1965, aroused considerable interest and produced queries as to whether other species of *Aloë* were similarly useful. So we bring to our readers the following article by Gertrude B. Foster, who had previously written on the subject in *The Garden Journal* four years ago, and extracts from an article in *Economic Botany,* Vol. XV, No. 4, by Julia F. Morton, Director of Morton Collecteana at the University of Miami, Coral Gables.

IT IS INTERESTING to see how a phrase can catch on. "Ever Hear of the First-aid Plant" was the title I gave to an article on the popular use of the cut-leaf of aloë to assuage the pain of a burn. It appeared in *House Beautiful Magazine,* July, 1963. It was reprinted in the *Journal American Magazine* supplement in September, 1963, and later in a California newspaper owned by Hearst. Since then dozens of smaller newspapers have been using the material in various forms (without authorization), and friends have reported seeing reprints of it in shops where cosmetics made of the "gel" of *Aloë vera* are sold. The Alo-Creme Laboratories, Fort Lauderdale, Florida, displays a plant of aloë with its sunburn lotion, hand cream, and other cosmetics. Their packaging is attractive, as is necessary to claim a place in a highly competitive field, and they are proud of the fact that the product is derived from one of the oldest plants in cultivation.

Having accumulated a file 12 x 11 x 3 inches thick of correspondence and notes on *Aloë vera* since my column on it in *The Garden Journal,* January-February, 1961, I was fortunate three years later to visit two places most interested in the subject. In Florida, at the main office of Alo-Creme Laboratories, I saw the plant being used because of its attractive terminal spikes of orange-red blossoms in landscaping. At the Palm Beach Habilitation Center, in Lake Worth, Florida, where herbs are grown for the nursery trade through a remarkable program carried on with mentally retarded and handicapped young people, *Aloë vera* was planted with culinary herbs in hanging baskets. These attractive miniature gardens, designed by Mrs. Dolores Benedict, Director of the Center, are in great demand where patio-living permits "cookouts" all winter. Along with parsley, chives, and sweet basil to flavor the barbecue sauce, a plant of *Aloë vera* provides relief to mishaps with an open fire.

Later in 1964, I saw thousands of *Aloë vera* plants raised from one little offshoot I had sent to Thomas C. Kendall of Snow-Line Farm in Yucaipa, California, two years before. Of the many herbs grown on his model farm for drying and packaging, *Aloë vera* is the only one he ships all over the country.

By means of a potting mixture of compost, loam, and sand, and by watering with seaweed fertilizer, Mr. Kendall has brought *Aloë vera* to flowering in three years under greenhouse conditions. Snow-Line Farm is named for the phenomenon that brings a blanket of snow to its mountainside location (as early as November in 1964) so the plants are not grown in the field as they are in Texas, for the Florida concern. When we visited the latter, there had just been a freeze in the crop area from which the plants are shipped to the Laboratories for manufacture; but while this turns the leaves red for a while, it does not damage the internal substance that provides the base of the cosmetics.

The Florida plants seemed to have a tougher integument and different leaf arrangement from the fanlike form of *Aloë vera* identified for Mr. Kendall by the Los Angeles Arboretum as *Aloë vera* or *Aloë officinalis.* Both plants have mucilaginous leaves which are covered with white spots when young. For window sill cultivation the fanlike form is most satisfactory. Aloë is an ideal house plant. It does not need direct sunlight—in fact, it sunburns and turns reddish if given it. It is a smaller plant and sends out many offshoots which in time will crowd the original basal clump out of the pot. I have had this form for four years and it has never bloomed in the greenhouse. Mr. Stockton, President of Alo-Creme Laboratories, sent me some of the heavier, radially arranged clumps from Florida; they do not seem to reproduce though they do have larger, longer leaves.

The empirical use of *Aloë vera* for burns seems to have little background of literature because the commonest connection with this aloë is as a cathartic. It is now seldom used medicinally for that purpose, but the spread of interest in it as a quick relief to burns is remarkable. In a Japanese nursery in Santa Barbara I asked for *Aloë vera.* The proprietor said, "Yes, I know the one you want, for cuts and burns. I can't keep it in stock. I try to hide a plant for myself when we get them in."

Margaret Kreig, author of the book on botanical drugs, *Green Medicine*, mentions *Aloë vera* in her introduction but never tells its story. Apparently enough plants are in cultivation now to warrant a full-scale research program on it. The folklore which is springing up around its use in the southernmost states includes cutting up the leaves and steeping them in water to make a drink which relieves ulcers of the stomach. The Los Angeles Arboretum has an extensive collection of South African aloës, but I did not see any specimens of *Aloë vera* when Mr. Kendall took me to the Arboretum in 1964. It is the one species absent in South Africa and therefore not described in the superb study on the genus, *The Aloës of South Africa* by Reynolds.

I hope that science will take a serious look at all the possibilities of *Aloë vera* before it attains the stigma of quackery through unscrupulous promotion as a cure-all. Up to now it has had folk-use as a home remedy, and such external application for relief from the pain of burns has been witnessed by me and attested to by doctors who have tried it. The mucilaginous juice dries quickly, providing protection from the air. It will stop the bleeding of small cuts in a way which suggests a vegetable "band-aid," but this could give trouble where foreign substances are sealed in the wound. The sunburn relief, unless from a manufactured product, is not too convenient because one doesn't take house plants on vacation. But I did find a woman next to me on a beach in California using "Alo-Creme Sunburn Lotion," which her traveling husband had brought to her from Florida. Allergists have recommended aloë-based shampoo for some patients. I have found it gives excellent re-

sults—it stopped my hair from drying and sluffing out.

Aloë vera is so easy to grow in the house that it is one plant which city dwellers could have with ease. A broadcast from the Springfield, Massachusetts, Science Museum in connection with the Mars pictures reported that *Aloë vera* and various cacti are being tested under simulated conditions of a planet where the atmosphere is too thin for ordinary vegetation. I have traveled thousands of miles following aloës, but I do not want to go up in "Space."

In her article on "Folk Uses and Commercial Exploitation of Aloë Leaf Pulp," Mrs. Morton reports on the folk uses not only of *A. vera,* but of other species of *Aloë* in the Caribbean Islands, Central and South America, Malaya, and Africa.

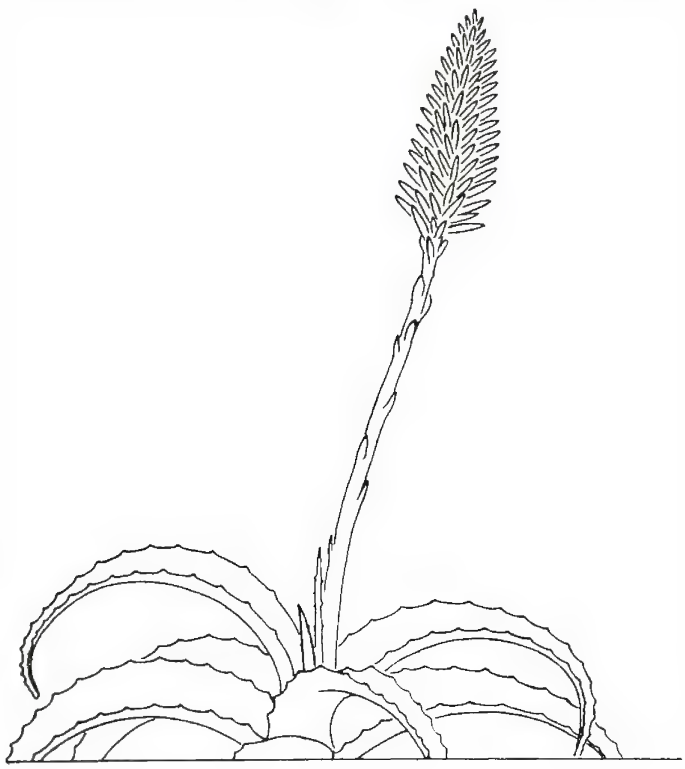
Natives in South Africa split the leaves of *A. saponaria* and lay the fleshy surface on wounds; use the clear pulp and yellow latex of this species and of *A. latifolia* to treat ringworm; and wash venereal sores with a decoction of the leaves of *A. ferox.*

The leaves of *A. barbadensis* are macerated by natives of Java and applied on burns to prevent blisters from forming; while the diced pulp, which is mixed with a rose-water syrup, is taken internally in the belief that it will cure tuberculosis in the early stages.

Malayans and Jamaican natives bind a slab of aloë pulp to the forehead for relief from headaches, and they massage the liquified pulp into the scalp to improve its condition and to stimulate the growth of hair. Mexicans also use the pulp as a headache remedy.

In the Philippines the leaves of *A. barbadensis* are used as a poultice for edema from beriberi, and the mucilaginous juice is taken with milk for kidney distress and dysentery. There the pulp is blended with wine and rubbed on the scalp to preserve hair.

Aloë vera.



Jamaicans beat the juice with egg and drink it as a purgative. On that island and in Cuba aloë is a popular cold remedy—as a decoction of the unpeeled leaf or as an infusion of the pulp in proof rum. And a cough syrup is made from the pulp, by cubing, washing, and pressing it in a cloth to extract the bitter juice, then boiling it in water for an hour, straining it, and boiling it again with two parts of sugar.

In Central America and northern South America, aloë pulp is used as a mild laxative. Colombia mothers coat their children's feet and legs with the juice to protect them from insects, and they often hang an aloë from the ceiling of house or shop to ward off flies.

Mrs. Morton also relates that the late Col. H. W. Johnston, who had started a collection of fruit, spice, medicinal, and other economic plants in 1912, added a field of *Aloë.* He shipped the dried leaves to pharmaceutical concerns, but after observing how quickly a severely burned hand responded to slabs of pulp, he began selling fresh leaves to local markets and also shipped them throughout the country. His customers used the pulp for skin afflictions or as massage for arthritic joints, or drank an infusion as a mild laxative for stomach ulcers. After Col. Johnston's death, his son-in-law and daughter continued to cultivate aloës and to supply the fresh leaves.

Aloë vera has pale green leaves, one and a half feet long, irregularly white-spotted when young. The flowering stem, two to two and a half feet tall, bears flowers whose one-inch-long, yellow segments almost equal the length of the oblong tube.

Mrs. Foster, in an article in *The Herb Grower Magazine* Vol. XIV, No. 2, 1961, quotes Gerarde's description of the plant as having leaves "very long, broad, smooth, thick, bending backward with certain little blunt prickles, full of tough and clammie juice like the leaves of Houseleek . . ."

And she reminds present-day gardeners that John Evelyn in the seventeenth century instructed his gardener that "Aloës cannot be watered too much in summer nor too little in winter. And when it does thus require it, expose it rather in the aire, so as no raine fall upon it; this will fill and plump the plant without watering; which in that season will kill it; then house it again."

In other words, treat *Aloë vera* rather like an African violet in winter and do not let water strike the top of the plant. In summer set the plant outdoors in a shady spot. In a good season a plant will produce offshoots which can be separated, when the mature plant is brought into the house before frost and repotted. Sometimes as many as ten offshoots can be taken and started on their way as new plants.

When aloë is grown in a pot on the window sill in the kitchen, it should not be in direct sunlight. And remember, when using it as a "first-aid plant," that only a small piece of the leaf need be broken off to apply on a burn; be careful not to destroy the growing tips at the center of the plant by pinching out those leaves.

WHITE HOUSE CONFERENCE ON NATURAL BEAUTY

By JAMES B. CRAIG *and* IRENE M. MOORE

Mr. Craig is Editor, Mrs. Moore Assistant Editor of *American Forests*. They presented a report to their readers from which the following has been extracted, with their permission, for *The Garden Journal*. Certain areas covered by the Conference are of pertinent interest to all concerned with conservation.

WHAT IS "natural beauty"? President Johnson gave his version to one thousand delegates to the White House Conference on Natural Beauty who visited him at the White House after their two-day conference.

He said: "Natural beauty is not a luxury for the satisfied. It is not a pleasant frill or a superficial enjoyment. Natural beauty, as you and I conceive it, is the world in which we live. It is the environment in which we are born, grow to maturity, and live our lives.

"It is more than a rich source of pleasure and recreation. It shapes our values. It molds our attitudes. It feeds our spirit, and it helps to make us the kind of men and women that we finally become. And the kind of men that we finally become in turn makes this great nation."

The Conference was an explosive idea factory. The Green Tide—those tree lovers including many members of The American Forestry Association, garden enthusiasts, wilderness devotees, and sportsmen—for the first time were placed in proximity with a new breed of conservationist—that hard core of educators, ecologists, and experts on environmental problems who do not believe that the planting of trees and flowers, important as these things are, mount a sufficiently broad attack on ugliness in our environment and the causes of it.

The aim of these new people is clear. They plan to upgrade the *quality* of living in the United States and they coolly anticipate rebuilding entire cities from scratch in the process. To these people the planting concept is a part of what they call the "cosmetic approach"—a horrible-sounding term if conservationists ever heard one—and they see it as part of the picture but not necessarily the most important part. In striving for quality, they want to conserve people, their minds, their art and their literature, and provide people with more congenial surroundings. In a highly interesting panel headed by Paul F. Brandwein, of The Conservation Foundation, Loren Eisley, of the University of Pennsylvania, said he wanted to see an effort made to restore the Anglo-Saxon Literature of Nature, an art form which apparently is unique in our culture.

The planners are concerned because the scope of the proposed effort seems to be eluding many segments of the public, including the Green Tide conservationists, and they are trying to educate us. "Too many of your tree and garden people are still geared to the pastoral dream of Thomas Jefferson," one expert told us. "America isn't so beautiful as many like to think. And problems in our cities, for instance, are not going to be solved solely by nice people planting peonies."

But the Green Tide is still running strong and deep and some are already predicting that the chief result of the Great Society will be an epic increase in the value of nursery stock. One roadblock in achieving a true meeting of minds was the mistaken idea of many tree and garden enthusiasts that most of the new breed were "engineers" in one form or another. Engineers, or rather what is considered the narrow engineer viewpoint, really took its swats at this conference. At one point the Green Tide was running with such force that landscape architect Lawrence Halprin implored the delegates to "admit that man is here to stay and we should not adopt the attitude that *all* man-made things are bad or that this is a case of trees versus asphalt or greenery versus concrete."

The conference gave people in many disciplines and lines of endeavor an opportunity to swap ideas with people of different points of view. When it was all over, people were saying the other fellow wasn't so bad, and there was considerable self analysis going on. One forester admitted he probably has been too occupied with silviculture to think much about people as a resource. An engineer, who told us he was there to "defend himself," said his people are trying to improve too but denied his people are impervious to natural beauty as some had charged. A sportsman asked us, "Who would deny we have been chiefly concerned about ducks?" These are all honest, able people and some of them are extremely effective missionaries. Already, some of them are planning to give "beauty" more attention at their future meetings. They can be of substantial assistance in helping to sell the public what Author William H. Whyte called "the nuts and bolts" ideas and know-how which make a theory a working success.

While the conference presented a staggering array of needs in blighted rural and urban areas, one left the conference hopeful that cures in rural areas offer much hope and that much has already been accomplished. As Don Williams, Administrator for the Soil Conservation Service, said, we already know that true beauty in conservation is more than "skin deep" and means coming to grips with soil and plant life on a permanent and continuing basis. One found himself wishing that our foreign friends at the Conference might have been shown some slides of some of our outstanding national parks, forests, and wildlife refuges, examples of farm planning in the Corn Belt, and some of our larger and better-managed industrial Tree Farms. With the Administration showing vigor, there is hope that such eyesores as auto junkyards, the billboard plague, and similar examples of ugliness may be removed, although the public may not get *everything* it wants. One visitor, Colin D. Buchanan, of the Imperial College of Science and Technology in London, said rural freeways in America have now been brought to a fine art literally, although more will have to be done about the "paraphernalia of motorists"—the staggering amount of space, structures, and services which are

all associated with cars. The conservationists have already been active in rural America and it's a good thing. As Panel Chairman Edward H. Graham said, any effort to preserve natural beauty in the United States must rely heavily on what is done in rural America where ninety-seven per cent of all our land is in non-urban uses: sixty per cent for production of crops and livestock and twenty per cent for production of trees.

But the cities are where ninety per cent of the people soon will be and, as Mr. Buchanan said, "some terrible things have happened there." Here is where the Green Tide conservationists and other groups will have to come to terms with the environmental planning specialists and engineers if cures are to be carried out. Biggest single round of applause at the conference was given to Mrs. James Bush-Brown, of Ambler, Pa., who told how Philadelphia women had encouraged residents to install garden boxes and flower pots in mile after mile of what was previously the bleakest and crime-ridden areas. Her slides were most impressive, but many people agreed with Walter Reuther, President of the United Auto Workers, that we must build cities which offer people "both bread and roses." Architect Karel Yasko deplored the mass-produced sameness and the cluttered look enveloping American cities. At the White House, Edmund Bacon, Philadelphia City Planner, told the President he should call for a massive reappraisal by the municipal governments of the country of all their policies and programs which affect the urban scene—and that would represent only an important first step.

The panel on roadside control of highways proved to be one of the most volatile, because there was some representation from the opposing team. Seven of the eight panel members present were agreed that the greatest blight on the highways today is billboards, so the presence of Philip Tocker, Chairman of the Board of the Outdoor Advertising Association of America, as the eighth panel member was like cornering Daniel in the lion's den.

Mr. Tocker lost no time in whipping out his white flag and read a resolution, prepared on behalf of the Outdoor Advertising Council for presentation to the President, which promised, in effect, that outdoor advertising would no longer be placed in areas not specifically zoned as commercial or industrial; that existing billboards would be removed from such areas; and that even where it was permissible, according to the zoning regulations, to place such advertising, the members of the Outdoor Advertising Council would refrain from doing so, if it would detract from the surroundings. "We are not insensitive to the times," Mr. Tocker said.

He received warm applause from the audience, but his triumph was short-lived. Senator Maurine Neuberger was the next to speak on the panel and she immediately launched into a "That reminds me of the time . . ." story of how, back in Oregon, it is the custom to take children to Union Station to see the trains. One day after the usual huffing and puffing and chugging of the engines, the train slowly started up and a little boy, who had reached over to touch it, said triumphantly, "Look, Dad, I pushed it!"

Senator Neuberger went on to force her point home by saying that the Outdoor Advertising Council was trying to jump on the bandwagon because the legislation was almost on the books, but that if it were not actually made into law, the Council would not police itself on its own. That Senator Neuberger may have known whereof she spoke became evident a few scant hours thereafter, when the Administration's proposed billboard ban turned out to be much closer to Tocker's views than to those of the other members of the panel. While the organizers of the Conference admittedly were trying to obtain a meeting of the minds by inviting people with different points of view, Tocker's appearance on the panel disgruntled some conservationists. One suggested the Conference had overlooked a real possibility in failing to invite "the chief spokesman for the Litterbug Lobby."

"There are no billboards in Hawaii," Mrs. Jack Marnie announced. She was invited to the Conference to tell how Hawaii did it. As Sign Chairman of the Outdoor Circle (a women's organization in existence the past fifty years in Hawaii), Mrs. Marnie told the audience that the lack of billboards in Hawaii could be credited to the foresight of the founding members of the Outdoor Circle who, "to make a long story short," bought out the only billboard firm in the Islands and promptly scrapped it. Before a new billboard firm could be brought into being, the women worked to have legislation put through banning billboards and other forms of outdoor advertising throughout the islands.

Erling Solberg, of the Department of Agriculture's Economic Research Service, commented that Hawaii was fortunate to have state-wide zoning—only four other states have this kind of zoning, Kansas, Mississippi, Michigan, and Oklahoma. He pointed out that only ten per cent of the seventeen thousand towns and townships in this country have any zoning regulations at all, which makes it extremely difficult to pass any kind of uniform legislation.

One of the most enthuastic panels at the conference was labeled Citizen Action. It was headed by Mrs. Arthur E. Whittemore and introduced NBC Reporter Nancy Dickerson as an enthusiastic participant. This Green Thumb committee outlined fifteen key ideas to assure the widest possible citizen participation in the conquest against ugliness, starting with immediate formation of a national Citizen's Committee for a Beautiful America. For, as John E. Terrell, of Sears Roebuck and Company said, "It will be people—not commissions—who will plant the trees. It will be people—not agencies—who will beautify. Natural beauty therefore has to be a people program."

As Dr. Luther Gulick told the Conference, "The North Wind made the Vikings," and the big wind in the beautification effort today is blowing from the White House. The public is responding to this campaign, and self-improvement is already the order of the day in many cities including Washington, D.C. In the nation's capital last month a small army joined the battle. "The State of Washington is ready" said Marvin B. Durning, of Olympia. State Senator Farr of California said the same. Others joined in. As of June 1, 1965, everyone in America is for natural beauty and many, many people are prepared to do something about it. Meanwhile, the Green Tide marches on, picking up allies as it goes.

THE INTRODUCTION OF NEW PLANTS FROM FOREIGN LANDS

By WILLIAM L. ACKERMAN

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THE PRACTICE of plant introduction began long before recorded history. While man was still a nomad, he collected seeds and plants of those fruits and nuts which struck his fancy and carried them to more accessible areas. In this way primitive agriculture began, as well as the actual introduction of plants—from their wild state into the first garden plots grown by men.

The process of introduction into North America was well advanced long before the white man arrived. The only plants that can truly be called indigenous to continental United States are the blueberry, cranberry, pecan, and sunflower. Even those which we frequently think of as "native" —corn, pumpkin, squash, and bean—were brought from South and Central America. The saying that "our agriculture is dependent upon foreign plant importation" is no idle remark, but a drastic understatement.

The development of a systematic program encompassing the objectives of plant introduction by the Government has developed slowly. It began with President John Quincy Adams's order to American consuls in 1827 to send home rare plants and seeds, and with the first agricultural appropriation of one thousand dollars by Congress in 1839. Not until 1862 was the Department of Agriculture established.

Finally, in 1898, a separate unit emerged for plant exploration and introduction, the result of the efforts of dedicated men who foresaw the importance of foreign crop plants to American agriculture. This unit, now called the New Crops Research Branch of the Crops Research Division, has continued and expanded the work and ideals of those early plant pioneers.

New plant materials are secured from abroad by exploration, purchase, and exchange. More than three hundred thousand plant introductions have been inventoried under P.I. (Plant Introduction) numbers. Much of this material represents new germ plasm of most of the grain, forage, vegetable, fruit, and ornamental crops already established in this country. It also consists of new crops, such as soybeans, crested wheat grass, lespedeza, zoysia, Bermuda grass, pistachio nut, dasheen, oriental chestnuts, Chinese date and Chinese water chestnut of more recent importation.

To assist in the handling of newly arrived plant introductions, the New Crops Research Branch has under its direction four Federal Plant Introduction Stations: Glenn Dale, Maryland; Miami, Florida; Chico, California; and Savannah, Georgia. Four regional plant introduction stations, which have state cooperation, are located at Geneva, New York; Experiment, Georgia; Ames, Iowa; and Pullman, Washington. The functions of all eight stations include:

Quarantine of introduced plants for a safe period to assure freedom from insects and diseases;

Preliminary evaluation of these plants for potential use in agriculture; and

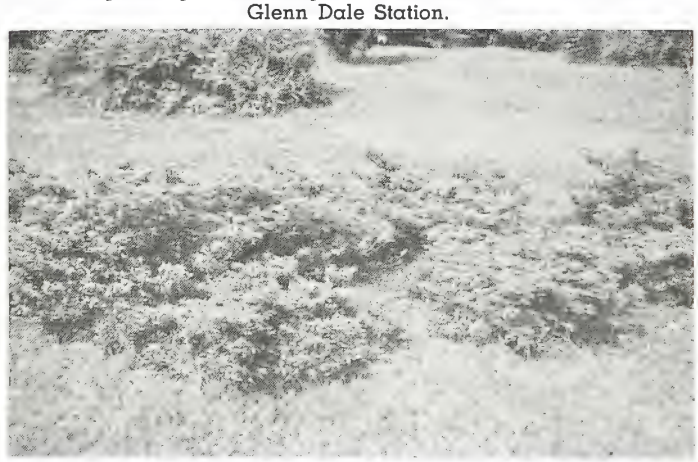
Propagation and distribution to Federal and State Experiment Station workers, plant breeders, and specialists. Most of the seed introduction of forage, grain, and vegetable crops are handled by the regional stations. The four primary introduction stations handle the vegetative introduction materials, and some nonagronomic seed materials.

The Plant Introduction Station at Glenn Dale, is, perhaps, the most highly developed of the four Federal Introduction Stations. It serves as the center for all quarantine activities undertaken by the New Crops Research Branch. The plant immigrants are first established here, and detained until they can be freed from quarantine restrictions and distributed to other areas.

Plant introductions grown at Glenn Dale are divided into three main crop categories: (1) ornamentals; (2) chemurgic crops; and (3) fruit crops. The two quarantine

Belgium-Glenn Dale azaleas appear to be best adapted to the Southeastern States.

Test planting of the Belgium-Glenn Dale azaleas at the Glenn Dale Station.



Glenn Dale azaleas as grown in a woods test planting at the rear of the Glenn Dale Station.

categories are: (1) post-entry quarantine of permissible plant materials, and (2) quarantine of prohibited materials. Although most ornamental plants enter under the post-entry quarantine program, many species of conifer, barberry, mahonia, bamboo, maple, ash, and willow must pass through more intensive investigations.

Chemurgic crops include potential drug, fiber, and industrial crops not yet grown commercially in this country. Testing and experimentation may indicate that some introductions are valuable for diverting acreage now utilized for crops grown in surplus.

Fruit crops include apples, pears, cherries, peaches, plums, apricots, almonds, grapes, and brambles.

Although the primary function of the station is the propagation, quarantine, and distribution of plant introductions, preliminary evaluation is also an important aspect of the work. Research work at this and the other three Federal Plant Introduction Stations is at present formulated on the basis of some twenty-three line projects. The Glenn Dale Station is directly engaged in eleven of these and, indirectly, through its seed storage programs in three others.

The diversity of plant introduction material demands that the interests of those handling them also be diversified. Although specialization is difficult under such circumstances, certain specific plant types, in all three of the general categories mentioned, stand out among the vast collection of plant introductions processed.

Among the ornamentals, perhaps the Glenn Dale hybrid azaleas are the best known as originating at this station. They were developed by B. Y. Morrison, formerly Principal Horticulturist of the then Division of Plant Exploration and Introduction. More recently, selections were made by J. L. Creech, who is Chief of the New Crops Research Branch, from a series of crosses between Belgium and Glenn Dale azaleas. Five of the most outstanding hybrid azaleas have been named: 'Bayou', 'Green Mist', 'Petite', 'Pink Ice', and 'Whitehouse'. These were released by the Crops Research Division in March, 1962, for distribution to nurserymen in the Southeastern States, to which preliminary tests had indicated that they were best adapted.

Seven seedling populations of *Rhododendron japonicum* collected in Japan and representing wide climatic adaptation—from hot, dry, sunny plateau areas in southern Japan to wet, bog areas at the northern limit of this species—have been under observation for several years. *R. japonicum,* a deciduous azalea, exhibits autumn coloration of reds and yellows. Closer observation of seedlings disclosed that on the basis of pigmentation of the scales on dormant buds, the red-leaved seedlings could be divided into three categories. Yellow-leaved seedlings possessed green scales on the dormant buds.

Preliminary investigations by E. G. Corbett, Horticulturist, suggest some interesting correlations between the pigmentation of senescent leaves, bud scales, and flowers, as well as possible cold hardiness.

Holly hybrid seedlings, the result of an interspecific cross, *Ilex cornuta* and *I. ciliospinosa,* and its reciprocal have been under observation for about five years. A study of the variations in phenotypic characters among the two reciprocal seedling populations has disclosed a number of interesting facts concerning the patterns of genetic inheritance between these two *Ilex* species. These results were recently published elsewhere.

In 1963, a test planting of approximately twenty-five hundred *Ilex cornuta* seedlings representing fifteen selected populations was established. It facilitated a study of variation in such characteristics as winter hardiness, plant form, leaf character, and such fruiting characteristics as variation in red pigmentation and degree of blackening because of frost and cold weather. Many *Ilex* species and varieties of recent introduction from Japan, England, and Scotland are proving of considerable interest to State Experiment Stations and nurserymen, since they present new forms of value for American gardens.

The Japanese iris, *Iris kaempferi,* is neglected in this country more than it ought to be. Cultural problems and the short life expectancy of the flower are the most serious disadvantages. Studies, begun in 1960, on a seedling population from a Japanese introduction show that seedlings differ considerably in the length of time individual flowers remain attractive. Evaluations, based on flower color, size, substance, and life expectancy, have resulted in a number of preliminary selections.

Among the chemurgic crops under investigation the Mexican yam, *Dioscorea,* has until recently received the most intensified study. Species of *Dioscorea* represent one of the best sources of the precursors of steroidal drugs, including cortisone which is used for the treatment of arthritis. One of the serious obstacles to the utilization of this yam commercially has been the difficulty of vegetatively

Holly introductions from Japan, England, and Scotland are grown for evaluation at Glenn Dale.

reproducing high sapogenia-yielding clones found through plant introduction and evaluation studies. The problem has been substantially solved by W. H. Preston, Jr., former Horticulturist at Glenn Dale, and points the way to commercial production of this crop in the Far South. The Station is now terminating this project.

Of increasing importance in recent years are several new chemurgic crops under investigation by J. J. Higgins, Plant Physiologist, including a potential fiber crop, kenaf, *Hibiscus cannabinus.* Kenaf produces more cellulose per acre in a year than trees and can be used as a blending component with wood fiber in the production of high-quality pulp and paper products. In experimental plots at Glenn Dale, growth of kenaf to a height of ten feet in one season from seed, resulting in yields of twelve to sixteen thousand pounds of dry stems per acre, is not unusual.

A wild African introduction, *Tephrosia vogelii,* contains rotenone in its leaves and is being investigated as a possible domestic source of this natural insecticide. Because the rotenone is deposited in its leaves rather than in its roots, *Tephrosia* should be well suited to mechanical harvesting.

Other chemurgic crops are under investigation. *Crambe abyssinica* (of the same family as rapes and mustards) grows wild in the Mediterranean region. Its seed-oil, a rich source of erucic acid, is an industrial raw material of value in the manufacture of synthetic fibers, detergents, rubber, plastic coatings, high-temperature lubricants, and resin paints.

The seeds of *Limnanthes,* a wild plant from our own West Coast, contain an unusual oil which, scientists predict, can be easily converted into waxes and greases for industry. *Crotalaria juncea* from southern Brazil is potentially valuable as an annual paper-pulp crop for high-quality paper.

The tree fruits, especially the pomaceous and stone fruits, are also an important phase of station activities. Extensive efforts have been undertaken during the last seven years by R. P. Kahn, Plant Pathologist, in the indexing of stone fruit introductions including ornamental *Prunus* for possible viruses. Considerable progress has been made to clear some two hundred and seventy-five cherry and two hundred other *Prunus* varieties under quarantine here.

'Bradford' pear, *Prunus calleryana,* has been successfully planted in a residential subdivision in University Park, Maryland. The trees are ten years old.

In 1964 a new virus indexing program was initiated by H. E. Waterworth, Plant Pathologist, for all new apple variety introductions and the more important varieties among the approximately one thousand older clones in our station collection. Another long-term program at Glenn Dale has been the annual evaluation of our large collection of apple and pear introductions for blossoming and fruiting characteristics as well as for disease-resistance.

Occasionally, plants introduced for a specific purpose are later found to have value in other uses. Perhaps the most outstanding example is the shade tree selection, *Pyrus calleryana* 'Bradford'. This pear, originally introduced and evaluated for rootstock purposes, was selected from a seedling population as especially attractive for its compact, upright form, thornlessness, bright shiny green, wavy-edged leaves which turn bronze-crimson in autumn, and its small objectionless fruit.

Introduced into the nursery trade several years ago, *P. calleryana* 'Bradford' is now being rather widely propagated by nurserymen in the mid-Atlantic States as a promising shade tree for street planting in residential areas.

Pistacia chinensis, originally introduced as a possible rootstock for the edible pistachio nut, *P. vera,* also shows promise as an attractive fall-coloring, ornamental shade tree. Under trial on both the East and West Coasts, it appears to have greater potential in the Far West, where fall coloration other than yellow among shade trees is extremely rare.

The outstanding foliage characteristics of several members of *Dioscorea,* introduced for their value as drug plants, make them desirable as ornamentals for the Southeast and possibly parts of the West Coast.

THE QUIET CRISIS

A Review

By VIRGINIA A. WEADOCK

Miss Weadock is a senior research assistant at The New York Botanical Garden and the Editor of *Sarracenia,* a periodical devoted to the various phases of biogeography.

IT IS COMFORTING to drive through the spring countryside and see the fields becoming green, the trees leafing out, the cattle and sheep grazing, the lambs gamboling, everything peaceful and seemingly holding its own. But, according to *The Quiet Crisis* and other recent publications, all is not so rosy as it seems. There is a crisis at hand, one which has been a long time in the making, but is now drawing to a head. The current deluge of contributions on conservation, littering, parks, junkyards, America "the ugly," further demonstrates this, as does the recent "White House Conference on Natural Beauty" (see page 241).

THE QUIET CRISIS. Udall, Stewart L. xiii + 209 pages, illustrated, indexed. Holt, Rinehart and Winston, New York, Chicago, San Franciso. 1964. $5.00.

Secretary of the Interior Stewart Udall has compiled an impressive amount of history on man's inhumanity to the land in these United States. His position in the Cabinet will lend weight to his theories and ensure a wider audience. An introduction by the late President Kennedy comments on conservation problems in general. The text is divided into fourteen chapters, twelve of which deal with the story of our land, its misuse, and the men who influenced policy, for better or worse. Four pages of acknowledgments list the sources of background material for the chapters, each of which will be summarized hereafter.

I: THE LAND WISDOM OF THE INDIANS. Udall's first point deals with the fundamental difference between the philosophy of the Indian and that of the White Man. The Indian was a part of the land, he revered it almost as a mother, "to use . . . and not use up" the land. He adds that "The confrontation of Indians and Whites had in it the seeds of hopeless misunderstanding from the start." He mentions some of the more unsavory episodes in the White Man's conquest of the land, many instances where there was wanton slaughter and eventually intense distrust.

II: THE BIRTH OF A LAND POLICY. The earliest settlers were more influenced by geography than the land was affected by people. The warm southern area developed a leisurely life and a feudal-type ownership, whereas the north produced subsistence farming and a self-sufficient citizenry; the Midwest was a combination of both; at a later date the Southwest became completely different, in that the land was regarded in the Indian manner. Thomas Jefferson, for example, was the product of plantation agriculture where no renewal of soil fertility was attempted; his studies of European methods, however, brought improvements to the United States. In his opinion, "The small landholders are the chosen people of God . . ." (how things have changed today!), but, as a result of land reform after the Revolution, the land west of the Appalachians was set aside to belong to all the people (i.e., public domain).

III: THE WHITE INDIANS: DANIEL BOONE, JED SMITH, AND THE MOUNTAIN MEN. This chapter portrays the background of our "western heroes" and the effect their lives and their excesses had on the nation. In spite of their "undisciplined creed of reckless individualism," Udall does not feel that it is fair to blame later thoughtless land exploitation on them, even though they embodied an ambivalence of attitudes, love for the land and an urge to exploit it for profit.

IV: THE STIR OF CONSCIENCE. Herein the author discusses the birth and development of a new kind of "nature interest," brought about by the actions and writings of William Bartram, John James Audubon, Ralph Waldo Emerson, Henry David Thoreau, Francis Parkman. Udall calls these five men the "forerunners of the conservation movement." Thoreau, in fact, proposed in 1858 that national preserves be set up for the protection of animals, land, and even hunters. According to Udall, however, their professed individualism was the cause of much destruction where "irresponsible independence" (every man for himself) was the creed of the day.

V: THE RAID ON RESOURCES. Herein Mr. Udall begins to develop his favorite theme, that the lack of government control allowed the rape of our resources. This is the period of the "Big Raid," brought about by the "Myth of Superabundance," the inexhaustibility of the land's resources. "The . . . extreme individualism that necessarily characterized the frontier dominated our attitudes . . . we raided the Indians, raided the continent—and raided the future." Udall concluded: ". . . that science and research held the keys to wise husbandry, and that government action was essential to save a permanent public estate of wildlife and water and forests and parklands." A series of photos adjoin this chapter and he has chosen very pointed captions for them: "The old land lessons were learned anew as ranges deteriorated." "For every ounce of gold collected, tons of topsoil and gravel were washed into the river courses below," "The devastation was not caused by logging alone."

VI: THE BEGINNING OF WISDOM: GEORGE PERKINS MARSH. This is the first of the chapters dealing with various people and movements in our conservation history. Because of the way Udall has chosen to present these groups of topics, with subject matter and times overlapping, a feeling of chronological order is difficult to maintain. Marsh was probably one of our first ecologists, appearing just after the Civil War, and was the "framer of a new land ethic . . ." He wrote *Man and Nature,* a standard of significance which was ahead of its time but which stimulated forestry reforms and many other improvements. This text has recently been reprinted and was reviewed in *The Garden Journal,* September-October, 1965.

VII: THE BEGINNING OF ACTION: CARL SCHURZ AND JOHN WESLEY POWELL. The reconstruction period after the Civil War brought a renewed attack on our resources, and with it the "threat that interlocking resource monopolies would remake our political system into an instrument of the economic royalists." The Homestead Act of 1862, however, stated that every man "should have an opportunity to own a 160-acre parcel of the American earth . . . ," and these solid "free-holders" helped somewhat to counterbalance the raiders.

A thorough discussion follows of Carl Schurz and his forestry practices, their effect on the nation, his conservation report of 1877, and of John Wesley Powell and his ideas for division of land by watershed and drainage basins. Udall concludes by saying: "As reformers, they [Schurz and Powell] lost the battle with their own generation. As land prophets, they won, and their insights have become basic concepts of the conservation movement."

VIII: THE WOODLANDS: PINCHOT AND THE FORESTERS. Much damage was done by the lumber raiders and their effective lobbies in Washington. By a legislative fluke in 1891, however, a rider to a public lands bill gave the President power to set aside forest lands as public reservations; an unassuming law, this was one of the "most far-reaching conservation decisions."

Gifford Pinchot was the "key man of a key decade." His theory of conservation-for-use, however, met head on with the scenic preservation concept since to him parks, wildlife, wilderness seemed wasteful.

IX: WILD AND PARK LANDS: JOHN MUIR. Muir felt a reverence for the land as had the Indians: ". . . wilderness freedom, like political freedom, was perennially in danger and could be maintained only by eternal vigilance. It was necessary . . . permanently to preserve large tracts of choice lands in public ownership." Muir and his Sierra Club car-

ried on a battle with lumber and cattle men who wanted rights in Yosemite, and eventually this area was set aside as a National Park. This action proved that "the vigilante" idea could work, if enough people were aroused.

Muir was a prolific writer, ranging from "lyrical to vitriolic," and he found eager acceptance in eastern papers for his nature stories and pleas for preservation. His first priority was preserving unspoiled and intact the best landscapes of public domain, and thus his ideas were at variance with those of Pinchot.

One of Muir's proteges was Stephen Tyng Mather who in 1916 became the first director of the newly formed National Park Service, whose concept was "to conserve the scenery . and the wildlife . . . in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Udall ends this chapter by saying: "More and more Americans see, as Muir did, that . . . there must be natural sanctuaries where commercialism is barred, . . . where every man may enjoy the spiritual exhilaration of the wilderness." (It seems today that we need many more people with this viewpoint!)

X: MEN MUST ACT: THE ROOSEVELTS AND POLITICS. The idea of any control over property and business was anathema to the American way of life, but soon even the people began to rebel against the "Robber Barons." Udall concludes: "This showdown made it plain that the only power that could assert the national interest was the power of the federal government."

After Theodore Roosevelt became President, his first major effort was the 1902 Reclamation Act. He thought of himself as "the trustee of the lands owned by the people." By use of the 1906 Antiquities Act he saved Grand Canyon from depredation. He replaced the century-old policy of land disposal with a new presidential policy of "withdrawal-for-conservation." He and Pinchot worked out a series of fees for grazing rights, because they felt there should be a stewardship-landlord principle. The term conservation, which had applied only to forests, eventually was broadened to include minerals, hydro-power, and all natural resources.

His 1908 White House Conference on Conservation was the high point of his efforts. He stressed coordinated federal and state action according to plan. Some objections were raised about loss of state's rights, but the die was cast. His "concept of conservation finally became fixed as a part of the American creed . "

Franklin Delano Roosevelt brought on a "second wave" of conservation, with Muscle Shoals, TVA, CCC, etc. Of TVA Udall says: "Comprehensive 'source to mouth' river-basin planning was begun on the largest scale in our history . ." There was fear of socialism, but Udall dismisses this by saying it was a "triumph of planning such as Theodore Roosevelt and Pinchot had envisioned." (The spectre of socialism is still with us, and perhaps on even a larger scale today.)

Franklin Delano Roosevelt ordered expansion of the eastern forests, under the federal government; behind this was the unwritten assumption that the big wasters had "borrowed and used up" resources to advance their personal fortunes; now the New Deal borrowed from the future to rebuild for the future (via deficit spending). The President also "believed it was necessary to put 'the physical development of the country on a planned basis,' and he created a National Resources Planning Board . . ." which, before it was disbanded, made several exhaustive studies that are "benchmarks of conservation planning."

XI: INDIVIDUAL ACTION: ORGANIZERS AND PHILANTHROPISTS. Udall says the big problem is to find the right mixture of government and private actions, since too many groups work only for their own narrow goals and not for the overall picture. Among the men and organizations mentioned in this chapter are the American Forestry Association (formed by private citizens), George Bird Grinnell, National Audubon Society (sponsored migratory fowl treaties), John D. Rockefeller, Jr. (instrumental in preserving many parks), and Governor Percival P. Baxter of Maine.

XII: CITIES IN TROUBLE: FREDERICK LAW OLMSTED. Udall begins by saying: "Our cities have grown too fast to grow well, and today they are a focal point of the quiet crisis in conservation." Olmsted was a pioneer in a field where the citizens didn't realize that his work was needed (he thought one should plan two generations into the future). His Central Park in Manhattan is the only survivor of the many he created.

Robert Moses (New York's second notable planner) has been involved "with asphalt for beach parking lots, for playgrounds, and for roads," whereas Olmsted "placed his emphasis on grass and trees, on the re-creation of nature within the city."

Udall discusses the current problems in terms of two legislative measures sponsored by the late President Kennedy: 1) Financial Aid to Urban Areas Act (to acquire open space), and 2) aid to cities to solve mass transit ills. According to Udall, a fatal theory is the idea that new property must constantly be put on the tax rolls; there is value to park land which may actually increase its worth by augmenting the taxability of surrounding areas. He concludes by stating: "City planning should put people first. Autos, freeways, . . and buildings should not be allowed to dominate a city . . ." He suggests that we create new cities (of thirty thousand to three hundred thousand population) before congestion becomes "intolerable."

Secretary Udall believes that planning on a regional basis is the key to the future. He adds: ". . . an anachronistic tax structure which penalizes property owners who preserve open space . is a serious impediment to sound planning. Why not tax the owners of ugliness, the keepers of eyesores, and the polluters of air and water . . ." In this same vein, Connecticut has passed legislation urging communities to lower taxes on retained open space, to obtain such land, and to lease it back under specified restrictions, backed up by the power of condemnation. A "conservation easement" has been put into a 1959 "open space law" in California; this permits cities and counties to buy property or easements for preserving green areas. The agency acquires a "right," but the owner retains property and pays taxes on it. A similar situation prevails at Ottawa, Canada, where the city bought agricultural land and leased it back to former owners so that it would always remain pastoral.

XIII: CONSERVATION AND THE FUTURE. From 1939 the Cold (and Hot) War swept conservation aside; our great scientific advances of the last twenty-five years had "encour-

aged a false sense of well-being, for our massive ability to overpower the natural world had also multiplied . . . our capacity to diminish the quality of the total environment." Many problems were created by technology and by urbanism, for example, ". . . our national sloth more than doubled our water pollution."

In spite of our knowledge, we had not restored fertility to wornout lands. "Our irreverent attitudes toward the land and our contempt for the Indians' stewardship concepts are . . . in our penchant to pollute and litter and contaminate and blight once-attractive landscapes." The Myth of Superabundance was being replaced by what "might be called the Myth of Scientific Supremacy, for it rests on the rationalization that the scientists can fix everything tomorrow."

Individual involvement is needed as well as collaboration of industry and science in order to conserve some resources. "Government leadership and . . . investment, however, must continue to play the larger role in traditional conservation work." Udall feels that the 1959-1962 study of the Outdoor Recreation Resources Review Commission "is a landmark analysis of our past failures and present opportunities . . ." He adds that the Land and Water Conservation Fund may have been a turning point in conservation history. "The status we give our wilderness and near-wilderness areas will also measure the degree of our reverence for the land." He would like to set up a permanent conservation corps to care for our public lands, and also to develop a national system of scenic highways. He suggests that Alaska be made an example of good conservation principles.*

"The quiet crisis demands a rethinking of land attitudes, deeper involvement by leaders of business and government, and methods of making conservation decisions which put a premium on foresight . . ." The big question for the future is the population growth and man's relationship with the land. What should we consider the "ideal ecology of man?" What is the proper "man-land ratio for our continent?" (Part of the almost insoluble problem results from the high proportion of urban over rural population and the consequent lack of feeling for nature.) Udall would like to see more treaties between nations, for instance, The Antarctic Scientific Preserve and the International Geophysical Year; we can either compete or cooperate.

XIV: Notes on a Land Ethic for Tomorrow. Udall deplores the fact that the level of the Gross National Product is the basis of our standard of living and that consumer consumption indicates our progress. "While our economic standard of living has become the envy of the world, our environmental standard has steadily declined . . . expedience tramples upon esthetics and development decisions are made with an eye only on the present."

"A land ethic for tomorrow should be as honest as Thoreau's *Walden,* and as comprehensive as the sensitive science of ecology. It should stress the oneness of our resources and the live-and-let-live logic of the great chain of life." "Only an ever-widening concept and higher ideal of conservation will enlist our finest impulses and move us to make the earth a better home both for ourselves and for those as yet unborn."

Thus he concludes his treatise on a quiet crisis which has become much less quiet recently. This is an important work which points up many of our past errors and suggests improvements for the future. There is no doubt that the time is *now,* before there is nothing left.

His desire to see more government planning and control in the future will not be universally accepted, for various reasons. He invokes the theme of ecology, yet the current programs in most national parks and recreation areas largely ignore ecology; if the original park concept (Chapter IX) could still be followed, our national parks would certainly be in better shape than they are.

With the upsurge of population, primarily in urban areas, and its concomitant increase in leisure time, the current god has become *recreation.* But the unfortunate trend of today's recreation seems headed more for "wreckreation," and I think it is time that we reinstate re-creation.

The work planned by the White House Conference on Natural Beauty (see page 241) will bring the problem before the eyes of many more people. This group's aim, however, seems to be solely concerned with improving what has been ruined, but very little was said about retaining that which remains of our original beauty, nor how to prevent destruction of it or of the rebuilt areas. Nevertheless, there is hope, as one of the commission members said: "It will be people—not commissions—who will plant the trees. It will be people—not agencies—who will beautify. Natural beauty therefore has to be a people program."

I think the time has come when we must divorce recreation (mass-camping, mass-boating, mass-amusement, mass-everything) from conservation. We need more parks and more recreation facilities, to be sure, but we shall never resolve the quiet crisis by allowing hordes of fun-seekers to invade our rapidly dwindling natural resources. (A good model to follow would be Maine's Baxter State Park which was endowed with a clause to keep the park "inviolate from the mechanical intrusions of man.") We must provide the facilities needed for leisure (created on marginal land, for example), but we must also preserve (as a kind of museum, perhaps) our wilderness, our dunes, our seashores, our prairies as they are now. This *can* be done without huge injections of federal funds, without violating long-standing property ownership, without the devastation of the bulldozer leveling land for camps or scenic routes. There are organizations (international, national, local) eminently qualified to do this, and in the process to bring nature education closer to the people.

Education is the crux of the problem, and Secretary Udall has done a great service to the country in giving us this text. Now it is up to the people, and governments at all levels, to press forward on all fronts. It is a war against ugliness, against vandalism, against thoughtless disregard of plant and animal life, against air and water pollution, against waste of our priceless heritage. Regardless of one's opinions of Secretary Udall's policies (and politics), this book should be read widely for its urgent message about our future.

*In contrast to his ideas, there are valid reasons why a permanent conservation corps could become a wasteful, ineffective, make-work program which would cost more than its worth. Scenic highways would be nice (at today's speeds, however, who would notice them?), but there are more important conservation problems, such as protecting the forests which would be cut down for rightofways. The greater part of Alaska now belongs to the government, and the record to date is not a good example of conservation practices.

A CHINESE BOTANIST IN AMERICAN GARDENS

By SHIU-YING HU

Dr. Hu is a botanist at the Arnold Arboretum Harvard University, Cambridge, Massachusetts.

(Continued from September-October, 1964)

IN WASHINGTON, D. C.

According to our schedule, we were to visit only the White House grounds, for the White House is closed on Mondays. Actually, through a special arrangement made by Mrs. Francis Patterson-Knight, we were shown all the rooms in the White House open to the public. While we were in the East Room, we were told that preparations were under way for a state occasion, for the late President John F. Kennedy was going to entertain the Prime Minister of Ireland. Our thoughts went immediately to the Hon. Mrs. Terrence O'Neill, who was with us on Long Island, for that night she would be an honored guest in that room.

Viewing the treasures and grandeur of the interior of the White House took so long that there was little time left for the gardens. We saw only the rose garden adjoining the President's Office, a small rectangular garden of one hundred and twenty-five by ninety feet. The background is framed by the colonnade that connects the Presidental Office to the White House proper and a hedge of *Osmanthus ilicifolius.* A large *Magnolia grandiflora,* planted by President Andrew Jackson, stands at the western end, and four *Magnolia soulangiana,* planted by President Kennedy, are at the four corners. A lawn occupies the center of the garden. In spring the beds contain tulips, crocuses, narcissus, and other bulbs; in the summer, roses, pansies, Shasta daisies, geraniums, columbines, and other favorites; in the fall, chrysanthemums, salvia, and heliotrope; and in the winter, bright foliage plantings. Other plants I noticed were *Buxus* 'Green Cushion', *Malus* 'Catherin Crap', *Ilex aquifolium, I. cassine,* and *I. opaca* 'East Palatka', and *Viburnum* × *juddii.* Mr. Ruback, Assistant Horticulturist of the White House Gardens, said that the garden is maintained by the National Park Service. Its purpose is to furnish the President of the United States an outdoor living room, where he frequently greets distinguished visitors and performs special ceremonies.

In the National Botanical Garden, a conservatory near the Capitol, we saw exhibits of subtropical plants, including *Araucaria bidwillii, Calathea leuconeura, Calliandra haematocephala, Codiaeum* (many forms), *Dion spinulosum, Glycosmis citrifolia, Hibiscus rosa-sinensis, Malpigha coccigera, Schefflera actinophylla,* and *Theobroma cacao.* It is noteworthy that the rutaceous plant in this collection, *Glycosmis citrifolia,* is not included in Alfred B. Graf's *Exotica 2—Pictorial Cyclopedia of Indoor Plants.*

The plantings on the Capitol grounds are simple. We noticed *Broussonetia papyrifera, Ligustrum japonicum, Magnolia soulangiana, Osmanthus ilicifolius* with abundant, fragrant, white flowers, and *Sophora japonica.* We were entertained in the Senators Special Room at luncheon as guests of the Washington Horticultural Society.

Today, October 15th, we visited various branches of the

At the left foreground, on the lawn of the White House, stands the *Magnolia grandiflora* planted by Andrew Jackson.

United States Department of Agriculture: the Plant Industry Station, the Plant Introduction Station (both under the Crops Research Division Agriculture Research Service), and the National Arboretum.

Dr. Neil W. Stuart, Physiologist of the Crops Research Division, met us. He is the discoverer of the application of chemical growth retardants ("Phosfan" and "Cycocel") for the suppression of vegetative growth and the induction of flower buds in azaleas and other plants of economic importance. He took us through a series of greenhouses, showing us many potted plants of one-year old *Rhododendron* 'Alaska'. Some of these plants were treated with three ounces of 0.4-0.6% of "Cycocel" (or "Phosfan") as a soil drench when they were seven months old; others were nontreated controls. The treated plants were subjected to cool storage at 10°C for four to five weeks, then they were brought into the greenhouse. These plants were profusely flowered, whereas the controls had none or only a few flowers.

In another greenhouse, Dr. Stuart explained the experiments on the control of algae on clay pots by the application of an organic compound commercially known as "36-20."

Afterwards Dr. H. M. Cathey, Horticulturist of the Crops Research Division, showed us potted plants of *Catalpa, Chrysanthemum, Ilex, Rhododendron,* and *Pinus,* the height of the plants and the number of flowers indicating that their responses to light treatments are very different. With this as an introduction, he took us to various rooms to show the constructions and equipments for experiments of the effect of intermittent light on the flowering of chrysanthemums and poinsettias. Finally, he demonstrated the application of a growth-regulating chemical, "Gibberellin," for accelerating growth and flowering in *Chrysanthemum morifolium* and *Hydrangea macrophylla.* He explained that the chrysanthemums are photoperiodic, that they normally require a nine to ten weeks photoperiod before flowering. The application of an aqueous solution of "Gibberellin" (0.1%), sprayed on the apical region and the expanding leaves, increases the elongation of the stems and the accumulation of dry weight eight to nine per cent over that of the control plants. They also flower earlier.

The hydrangeas are thermoperiodic plants which require a cold storage of six weeks to insure flowering. The application of "Gibberellin" on defoliated plants shortens the time for cold storage and accelerates growth and flowering.

Like a new sprout of an old tree, the United States National Arboretum is full of signs of new growth and is rich in strength for further development. Dr. Francis DeVos, Assistant Director, and Dr. Frederic G. Meyer, botanist in charge of the herbarium, greeted us in front of the Administration Building, housing also library, auditorium, and herbarium. The building is so new that many of the rooms were not ready for occupancy at the time of our visit. We were taken to a hillside on which are planted the dwarf conifers donated by William T. Gotelli. We observed many fine specimens of *Ilex* 'Aquipernyi', *I. ciliospinosa, I. decidua, I. opaca* 'Foster II', *I. integra, I. latifolia, I. sugeroki,* and *I. vomitoria* 'Stokes Dwarf'. We were shown selections of F_1 generation from an interspecific hybrid of magnolias. The parents are *M. virginiana* (diploid) and *M. grandiflora* (hexaploid). The offspring magnolia 'Greeman' looks more like *M. grandiflora,* whereas magnolia 'Verbanica' is more like *M. virginiana.*

We went to the field where Dr. Donald R. Egolf performs his cytogenetical and cytotaxonomic studies in the genera *Pyracantha* and *Viburnum.* With the cooperation of arboretums and botanical gardens, such as the Royal Botanic Gardens, Kew, the Royal Horticultural Society's Garden at Wisley, and the Jardin de Plantes, Paris, Dr. Egolf has built up the most complete living collections of *Pyracantha* and *Viburnum* in the world.

Finally, we were shown William F. Kosar's interspecific holly hybrids in the greenhouse. Mr. Kosar has produced many attractive forms with good foliage and luxuriant fruit.

When we returned to the bus, we were delighted to see Harry William Dengler, Extension Forester, University of Maryland, who brought us a most welcome present—a basket of 'Delicious' apples.

In Virginia

Williamsburg was the capital of the eighteenth-century Virginia Colony; today it is an educational show place, demonstrating to visitors the early history of America. Through the generosity of John D. Rockefeller, Jr., an area of one hundred and thirty acres, with about five hundred houses and gardens, has been restored to its early appearance. Through these restored houses, taverns, gardens, and greens visitors can cross the bridge of time and acquire an insight into the life of the Colonial period of this region. Our visit began with a thirty-five minute film, "Williamsburg—The Story of a Patriot." It is a dramatic introduction to the history and significance of Williamsburg. Then we visited three James River Plantations, Westover, Berkeley and Shirley.

On the outskirts of Williamsburg, Alder R. Eaton, Director of Landscape Construction and Maintenance of Colonial Williamsburg, called our attention to two huge *Quercus alba* which had been planted about 1750. Along the highway, in swampy areas, are many *Salix nigra,* and we noticed that *Ilex opaca* and *Cornus florida* grow wild in the woods. Presently we drove through very colorful forests in which the contributing species were *Acer rubrum, Betula nigra, Cornus florida, Liquidambar styraciflua,* and *Juniperus virginiana.* The most striking features were the bright yellow leaves of *Campsis radicans,* hanging from the top of small trees, and the brilliant red leaves of *Parthenocissus quinquefolia* clinging to the trunks of large and small trees. *Baccharis halimifolia (Compositae),* a large bush with beautiful white inflorescences, is very conspicuous on the borders of marshes. We stopped for a closer examination of the flora and found the forest almost impenetrable because of the growth of *Lonicera japonica.* We saw *Aralia spinosa* about eight meters high, with spinose leaves and black fruits.

River transportation was essential to plantation life, and the estates we visited all have miles of shoreline. Our first stop was at Westover, now owned by Mrs. Bruce Fisher. The enormous size of *Ulmus alata* and *Liriodendron tulipifera* by the river, the abundance of *Buxus sempervirens,* the sweet songs of hundreds of birds, the breath-taking vista of the front lawn, and the Georgian architecture of the house

The largest-known willow oak, Quercus *phellos*, is in the garden of Hill Carter, Jr., Shirley, Virginia.

combined to make this one of the most enchanting places we visited on this tour. We passed through a gate and entered the garden. The effect of the high cost of labor is very evident—the garden is very much neglected, almost a wilderness. It is apparent that formerly a strong Oriental influence prevailed. *Nandina domestica* and *Rosa bracteata,* both natives of China, are still growing here. Near a wall and hidden by tall bushes, a lovely white marble statue of the Chinese Goddess of Mercy (Gwan-Yin) stands pitifully neglected with a big scar across her neck. Mr. Filmore of Duke University fell in love with her, and we all expressed the hope that the statue will eventually be saved from destruction.

From Westover we took a colonial road, designed in 1765 for carriages, to Berkeley Plantation. The mansion has been restored and is open to the public as an example of the home of a leading citizen of Virginia's "Golden Age." It was built by William Harrison, grandfather of the ninth President of the United States, Benjamin Harrison, who was born here. As we approached the mansion, we found the path covered by the long needles of loblolly pine *(Pinus taeda).* The proprietors, Mr. and Mrs. Malcolm Jamieson, explained that pine needles, like a carpet, keep dust off the floor. After viewing the treasures in the mansion, we walked to the beautiful garden and there enjoyed a picnic lunch.

Our last stop for the day was at Shirley Plantation. Shirley is not restored; it has been occupied for nine generations by the Hill Carter family and kept in good repair. In the eighteenth century it was the base for the largest agricultural operation in Virginia. The census of 1799 indicated that its owner, Charles Carter, grandfather of Robert E. Lee, was the largest slave holder and cattle raiser in the State. Now Hill Carter, Jr., uses this eight-hundred-acre farm for livestock, soybean, corn, and other grains. Here we saw the largest willow oak *(Quercus phellos)* in existence. Other unusually large specimens which we observed were *Carya pecan, Gardenia jasminoides. Ilex opaca, Juglans regia, Lagerstroemia indica,* and *Melia azadracha.*

At a reception that evening in the East Lounge of Williamsburg Inn, we met many horticultural, agricultural, and civic leaders of the area. Mr. Eaton told me that there were some specimens of *Ilex latifolia* in the back yard of the Inn. In the dim light diffused from the windows, he pointed out a striking sight—*Ilex latifolia* espaliered against the white walls of the building for a height of ten to fifteen meters.

Today, October 18th, was the last day of the tour. In the morning we visited many gardens restored and maintained by Colonial Williamsburg, Incorporated, a nonprofit organization dedicated to the purpose "That the Future May Learn from the Past." We attended a tea in Semple House, the home of Mr. and Mrs. Alden R. Eaton, our host and guide for the Williamsburg area. In the afternoon we visited the College of William and Mary, "the second oldest college in the United States." After this, a friend of Harold Hillier took him and Mr. and Mrs. Robert de Belder to the Dismal Swamp. The Duke and Duchess of Abercorn and I took a bus for Washington where we separated, they flying to Texas and I to Boston. The other members returned to Washington the next morning in our chartered bus, where they were reunited with Mr. Hillier and the de Belders for the flight to Europe.

Last night's experience of seeing the unusually espaliered *Ilex latifolia* so moved me that I made plans to rise early and take some pictures. Using a map, I started out at sun-

(Continued on page 255)

Ilex latifolia is espaliered against the white wall of Williamsburg Inn, Colonial Williamsburg, Virginia.

Monstera obliqua expilata.

Aglaonema pseudo-bracteatum.

AROIDS IN THE HOME

By WALTER SINGER

Mr. Singer is staff photographer of The New York Botanical Garden.

AROIDS ARE MEMBERS of the *Araceae,* one of the largest families in the plant kingdom. Of the more than one hundred genera and one thousand species, the majority seem to be at home in swampy, tropical regions all over the world. A few are hardy, such as our American skunk-cabbage *(Symplocarpus foetidus)* or the European arum *(A. maculatum),* also called the cuckoo-pint or lords-and-ladies. The *Araceae* are distinguished by the spathe-bearing inflorescence containing the spadix. Because of their colorful foliage or spathe and their durability in modern living quarters, aroids have become very popular house plants. Here are twelve well-known members which are among outstanding house plants:

Aglaonema, usually known as Chinese evergreen, comes from the tropical swamps of Asia and Africa. Several of them can be grown in water, such as *A. modestum* which is the forerunner of all of them. Shown here is *Aglaonema pseudo-bracteatum,* probably the most colorful foliage plant among the aglaonemas. It is easily propagated from cuttings or stem (cane) divisions. Some of the aglaonemas produce seeds easily and these make handsome, compact plants, more compact than those grown from cuttings.

Anthurium is a richly varied genus, its members excelling both in foliage and colorful spathe. Great numbers of anthuriums are shipped as cut flowers in all sizes and colors from Hawaii; these are usually variants of *A. andreanum.* As a flowering house plant *A. scherzerianum* is well liked, since it is compact and has equally colorful flowers although smaller in size than the *andreanum* hybrids. *A. crystallinum* and its variations are best known for their colorful, velvety foliage.

Alocasias are not so often grown as house plants as are

Xanthosoma lindenii magnificum.

Scindapsus aureus 'Marble Queen'.

Syngonium hoffmannii.

Alocasia × chantrieri.

other aroids, probably because they may be a little more "on the tender side" and require a great deal of humidity. The two most suited for growing at home are *Alocasia cuprea* and *A. sanderiana;* hybrids with these as parents are sometimes even more adaptable for growing in the home. Good aids for successful culture are steady heat and placing the plants on water-filled, pebble trays.

Caladiums are raised from tubers and are not evergreen all year, but their large, colorful leaves are reasons enough to grow them. After they have been rested during the winter in a dry and dark storage place, caladiums can be started again. In summer they are excellent garden plants.

Dieffenbachia or dumb-cane has more value than its legendary use for paralyzing or swelling the tongue of a mother-in-law. Dieffenbachias are among our hardiest house plants, especially *D. amoena,* a native of Colombia. Leggy plants are easily air-layered or cut back and propagated from cuttings or pieces of stem (cane).

Homalomena is a relatively small genus of the aroid family. Its members are natives of tropical Asia and America and are better known in the trade as curmerias. Shown here is *H. wallisii,* one of the most colorful of the homalomenas; its cultivation is similar to that of most anthuriums.

Monstera deliciosa, illustrated on the cover of this issue of *The Garden Journal,* is by far the oldest and best-known aroid house plant, and it is also the plant which produces a very delicious fruit known as ceriman. *Monstera obliqua expilata,* pictured in these pages, is the lace-leaf monstera.

Philodendrons are the most widely distributed and the most frequently propagated aroids. There are three groups: the climbing (vine), the sessile, and the tree-type. Although *P. oxycardium,* the vine, is the best-known commercial philodendron, variations of the sessile types, such as × McNeilianum, have become very popular because of their hardiness and cold-resistance.

Scindapsus is the proper name for aroid vines which are often erroneously called "pothos" in the florist trade. Because of their colorful, leathery foliage, they make hand-

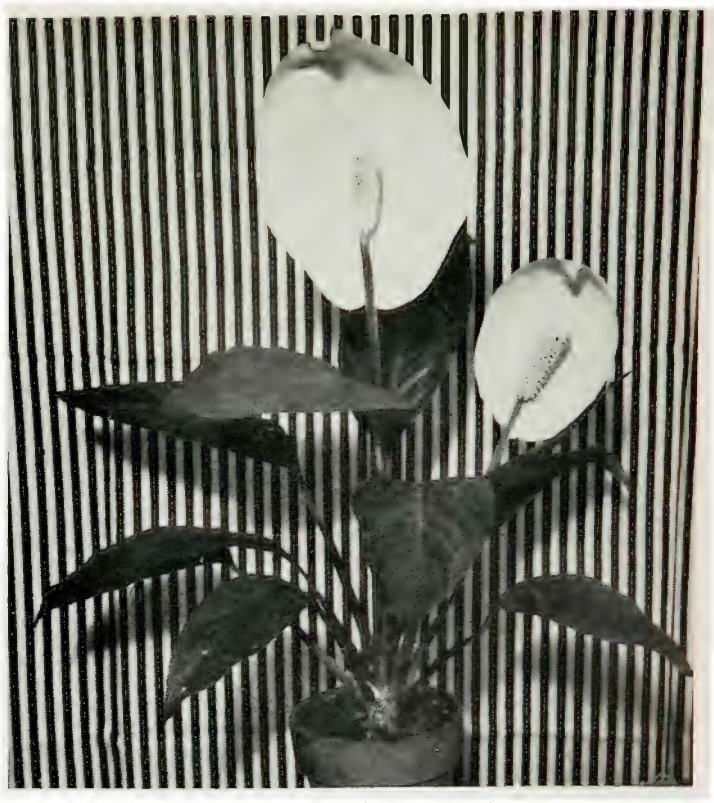
Anthurium crystallinum.

Caladium 'Candidum'.

Homalomena wallisii.

some vine plants as well as good subjects for growing on bark or a moss-stick, much the same way as philodendron vines are successfully grown. Illustrated is *Scindapsus aureus* 'Marble Queen', the most popular and most colorful of the genus.

The generic name *Spathiphyllum* indicates the similarity of the spathe to a leaf (phyllon), which is characteristic of the members of this genus. Most of them are natives of Colombia where they grow in dark, swampy locations; no wonder then that they are among those plants which can be grown in low light conditions in the home. Spathiphyllum 'Mauna Loa', shown here, is a hybrid which was originated in Los Angeles; it has an exceptionally white and large spathe.



Spathiphyllum 'Mauna Loa'.

Syngonium podophyllum and its varieties have become very popular for growing in the house. Syngoniums can be easily grown against bark and are equally well suited as small plants in terrariums. Syngonium is known in the florist trade as nephthytis, a name which belongs to an entirely different aroid from Africa.

Xanthosoma is a botanical name for the genus of aroids

Dieffenbachia amoena.

Philodendron × McNeilianum.

that are grown for their edible tubers. Yautia, malanga, and tania are the more familiar names of these plants in the West Indies, where their tubers or corms are harvested to be used as food in much the same way that yams and potatoes are treated and eaten. One of the most beautiful foliage plants is *Xanthosoma lindenii magnificum,* a truly magnificent house plant.

RHODODENDRON SPECIES FOUNDATION (from page 235)

botanic gardens have been distributing incorrectly named material throughout the world. Obviously, it is high time that this practice be stopped and the only way to stop it is to make available for distribution viable seeds resulting from controlled pollination of authentically named material, and/or to make available vegetative propagations of such material."

By way of illustration he cites how "an authentically named reservoir of living material of the genus *Rhododendron* could be built up and the material distributed to interested parties." He suggests one collection in Great Britain and one in America.

In his letter to me, Dr. Fletcher says, "As you see, the whole matter ties up with what you are intending to do in America."

An opportunity has been presented of not only preserving the true forms of species by establishing them in a collection here in America, but of having them in our own gardens someday. Will you help us in our efforts to make the best possible use of this opportunity?

Further information may be obtained by writing to Dr. Walker, whose address is R.R. #2, Box 455, Creswell, Oregon.

A CHINESE BOTANIST IN AMERICAN GARDENS (from page 251)

rise in search of the Williamsburg Inn. The songs of birds and the sight of large trees attracted my attention. I walked through an underpass and there in an area unattractive to the general public found a veritable gold mine of *Ilex,* introduced as well as native species. There were *Ilex aquifolium* (Europe), two forms of *I. cassine,* two forms of *I. cornuta* (China), *I. crenata* (Japan), *I. glabra, I. integra* (Japan), *I. latifolia* (China and Japan), *I. pernyi* var. *veitchii* (China), and *I. vomitoria* 'Nana'. Because of its low stature, compact foliage, and red fruit, the last-named species is a superior substitute for *I. crenata* in this region. While making notes about these species and taking pictures of some specimens, I forgot the passing of time. Suddenly I realized that it was late, and I had to race back in order to join the group for the scheduled visits.

We first stopped at the Palace Green. The most striking features among the plantings are the old and disfigured tree trunks of *Broussonetia papyrifera.* This species, introduced to Williamsburg in 1765, is very common in private gardens and public plantings. Fortunately the original introduction was selected from a staminate plant, so the species, which is a troublesome weedy tree in Chinese gardens, has not been spread by birds here in America.

We visited the gardens at the Governor's Palace, the Deane House, the Brush-Everard House, the Semple House, and others. The gardens of Williamsburg in essence are formal, copied from their English precedents with some modifications. The copying is not limited to the general layout, the geometrical parterres framed with clipped hedges of *Buxus* and *Ilex,* the pleached alleys, and the topiary work; the vegetables, herbs, and medicinal plants in the kitchen gardens are of European origin. Even the trees and shrubs used for decorative purposes are predominantly introduced from Old World gardens.

Only forty-six of the one hundred and seven woody species I observed in the gardens are native to eastern North America. Fifteen of these are found exclusively in the Canal and "Falling" Garden and the Wildness Area not associated with the formal gardens. Actually, over two-thirds of the plants in the Williamsburg gardens are introduced species.

In the academic world of the United States, the College of William and Mary has the distinction of owning the oldest school building in English-America and of being the seat of the first chapter of Phi Beta Kappa, an honorary society for high scholastic achievements. We visited Wren Building, the oldest on the campus, and the New Memorial Hall in which we saw one of the best theaters in the country and the Apollo Room of Phi Beta Kappa. The campus is rich in beautiful tree specimens, but time allowed us to see only the conifers. The college is building up an American Cryptomeria Center. Small, two-meter-high plants of *Cryptomeria japonica,* planted in 1947, are now beautiful specimens about fifteen meters high. We also saw a plant of *Cunninghamia lanceolata* with several trunks.

Dr. John T. Baldwin, Jr., Professor of Biology at William and Mary, is a prominent specialist in the genus *Buxus.* He has one of the most complete collections of the species and their cultivars. He has hybridized, bred, and selected many excellent cultivars for horticultural purposes. We were fortunate to see his collections.

We are living at the time of man's overrunning of the wilderness. What we have saved, and what we will save in the next few years will be all the true wild nature that will remain to be passed on to future generations. There will never be another change!

We are far behind; it is already late. But if we act now, we can save at least a part of America's living past—enough to win the everlasting gratitude of the future.

Much has already been done to save the large scenic features and wilderness areas of our mountain regions. Relatively little has been done to preserve the less spectacular woods, grasslands, swamps, and the deserts of our great interior, and the shorelines of our rivers, lakes, and oceans. Our vital job now is to fill in these gaps, simultaneously protecting from harm the parks and reserves already set aside. — from NATURE CONSERVANCY

THE VEGETATION OF THE VIÑALES REGION, CUBA

By BROTHER ALAIN LIOGIER, F.S.C.

Honorary Curator of West Indian Botany at The New York Botanical Garden.

AMONG THE FAMED CUBAN LANDSCAPES, one of the best-known is Viñales, in the Province of Pinar del Rio, some one hundred miles west of Havana City. This landscape is situated in a geological formation, about fifty miles long and ten to fifteen miles wide, on the northern part of Pinar del Rio, the westernmost Province of Cuba; it extends from the Sierra de los Acostas and Paso la Sierra near the town of Guane to the west, through the Sierra de Pendejeral and Sierra de la Güira, near San Diego de los Baños to the east, including the Pan de Guajaibon, the highest point in western Cuba.

Viñales is accessible by a fairly good road; nevertheless, no complete account of its vegetation has so far been published. This is understandable, since for most of the people Viñales is but a beautiful panorama, to be contemplated from the *mirador* (outlook above the valley), and a small town at the bottom, surrounded by the *mogotes* or haystack mountains. Few people have been inside the mogotes, few know the hidden valleys or *ensenadas,* and fewer still have been in the *hoyos* or sink-holes, completely surrounded by tall limestone cliffs; few botanists have been on top of the steep limestone hills, or seen the plants of the area growing in their natural habitat. In this paper I shall describe what I have often observed, while collecting plants in that region, in its pinelands and its mogotes.

GEOLOGY AND SOILS

At the bottom of the valley lies the oldest rock formation in Cuba, evidenced by the deposits of the Jurrassic era, containing the oldest fossils in Cuba, the Ammonoids, which were found there for the first time by the Cuban naturalist Carlos de la Torre. The bottom of the valley is flat and covered with the Matanzas clay, fertile and red, for growing sugar cane; in some places sandy soil predominates and is used for tobacco growing.

North and south of the mogotes are the sandstone hills, known as *Cuchillas del Pinar.*

Since a complete list of the vegetation of the region would be quite difficult to put together, and much too long, I shall cite only the most interesting plants.

Because of its geological importance, Viñales has been the object of scientific studies, and geologists, mineralogists, and geographers have spent considerable time investigating the mysteries of this strange formation. Much is yet to be done, for the origin of the mogotes has not yet been completely explained. Nonetheless, I should like to remark that after a thorough study of the vegetation of the mogotes, I am inclined to take the similarity of the vegetation of the Viñales region to that of the coastal thickets as evidence that the mogotes were once islands protruding from a submerged Cuba. This island theory is bolstered by the similarity of the vertical cliffs and the sharp limestone rocks, which form the top of the mogotes, to the "dog-tooth" coral rocks on the tropical shores; these mogotes stand on the flat valley, representing the former sea bottom, thus completing the similarity.

THE PINAR FORMATION

On the way from Pinar del Rio City to Viñales, the road crosses a region whose vegetation is similar to that of the Atlantic Coast of the southern United States, mostly in Florida and Georgia; this plant formation is noticed long before reaching the mogotes or even before seeing them from a distance. The area has been carefully studied, because it is readily accessible from the road that crosses it; I shall call it the "Pinar Formation." It stands on sandstone and, in general, forms hills rolling gently to an altitude of six hundred to nine hundred feet above sea level. These hills are located at the north and south of the mogote formation, though in certain places they are also found between two rows of mogotes, as can be observed near El Ancón Valley, between Sierra del Ancón and Sierra del Jíbaro.

The predominant plants in this formation are *Pinus tropicalis* and *Pinus caribaea,* alternating and sometimes intermingling with grooves of *Quercus oleoides* var. *sagraeana.* These two formations contrast greatly with the rest of the tropical flora of the Island, having few species represented by many plants of the same species, while the tropical formations have in general many species represented by few plants of the same species in a given area. Time and again, these pinelands have been burned out, probably to allow cattle to get the tender grass shoots which come out after the first rains; but the small advantage gained has destroyed the beauty of the landscape. Unfortunately, there has also been careless cutting of the valuable pines and oaks, used during centuries for construction and furniture. Nevertheless, young pine trees can be seen growing anew in several places, since fires in the pinelands have been prevented.

PINE BARRENS

Sometimes, after being burned, the ground has been invaded by *marabu (Dichrostachys cinerea)* and weeds able to survive the lack of good soil and water.

In the drier parts of these hills, because of the repeated fires, only the herbaceous vegetation is visible after the rains have started. This herbaceous vegetation is made up mainly of grasses and sedges, of which the following are typical: *Achlaena piptostachya, Andropogon gracilis, A. saccharoides,* and *A. virginicus, Aristida neglecta, Ichnanthus mayarensis, Leptocoryphium lanatum, Panicum acuminatum, P. albomarginatum, P. ghiesbreghtii, P. pilosum, P. sellowii,* and *P. zizanoides, Reynaudia filiformis, Rhynchospora globosa.*

FORESTS

In the whole region, small wooded areas are found, probably remnants of former forests destroyed since the colonial

Above, general aspect of the mogotes. This one is Sierra de la Guasasa in Viñales. Note the round tops, the cliffs, and the talus covered with vegetation.

Upper right, Sierra de San Vicente. This is one of the highest mogotes in the Viñales region; its height is about four hundred meters.

Lower right, Valle del Ancón, surrounded by mogotes on three sides and with Pinares on the other side. This is a typical inner valley of the Viñales formation.

times. Small trees and shrubs abound, such as: *Andira inermis, Befaria cubensis, Byrsonima crassifolia, B. pinetorum,* and *B. wrightii, Chrysobalanus icaco var. pellocarpus, Citharexylum fruticosum, Conostegia xalapensis, Curatella americana, Dodonaea viscosa, Eugenia punicifolia, Hypericum styphelioides, Lyonia myrtilloides, Miconia ibaguensis, M. delicatula,* and *M. impetiolaris, Pachyanthus cubensis, Psidium guayabita, Purdiaea cubensis, Rhus copallina* var. *leucantha, Rondeletia correifolia, Swietenia mahogoni, Tabebuia lepidophylla, Vaccinium cubense, Xylopia aromatica.*

The herbaceous vegetation is represented by: *Hibiscus costatus, Hypericum hypericoides, Pavonia malacophylla, Melochia villosa, Neurolaena lobata, Nodocarpaea radicans.*

Some vines grow among the trees or shrubs: *Clitoria rubiginosa, Gouania lupuloides, Serjania diversifolia.*

Grasses and sedges abound among the forest: *Andropogon fastigiatus* and *A. virginicus, Aristida refracta, Rhynchospora globosa,* and *R. stellata.*

Small herbaceous plants can also be found: *Bletia purpurea, Borreria laevis* and *B. verticillata, Buchnera elongata, Cassia diphylla, Declieuxia fruticosa* var. *mexicana, Diodia rigida, Spiranthes squamulosa* and *S. tortilis, Tetramicra eulophiae, Zamia pumila.*

Along the streams, the vegetation becomes denser, the presence of water favoring the growth of many plants which need humidity. In some places *Jambosa jambos (pomarrosa),* introduced from Asia, has taken possession of the area, and no other plant can grow under the dark shadow of its leaves. Here are some of the native plants found in the wet places: *Belotia grewiaefolia, Cecropia peltata, Didymopanax morototoni, Gynerium sagittatum, Lonchocarpus domingensis, Luehea speciosa, Xylopia aromatica.*

Among the ferns are the following genera: *Cyathea, Alsophila, Hemitelia* (all tree-ferns), *Dryopteris, Asplenium, Adiantum,* and the climbers *Lygodium venustum and Odontosoria aculeata.*

And last *Calyptrogyne intermedia,* a palm smaller than the royal palm *(Roystonea regia)* may be found in some places. The latter is very rare in this particular soil.

Only rarely, actually in two or three localities, can *Microcycas calocoma,* a living fossil from the Secondary era, be found. This beautiful plant has been cut down without any apparent reason, and since the seeds are difficult to germinate, it is becoming scarce.

As one nears the *mirador* of Viñales, he has the impression he is looking upon something completely unreal. From this point one views the floor of the valley and the rounded tops and vertical walls of the mogotes emerging from the red clay and sandy soil where sugar cane and tobacco grow. These mogotes form an imposing sight—the royal palms dwarfed by the tall haystack mountains and at the far right the village of Viñales whose red roofs glisten in the afternoon sun.

The Mogotes

About a century ago, Charles Wright, who was sent by Asa Gray of Harvard University, collected in the mogotes many of the species known today, a number of his collections being the type specimen for these species. He also collected land snails and was the first collector of many species, since each mogote has its peculiar snail fauna. Later, the Swedish botanist Eric L. Ekman explored the region quite thoroughly; his amazing physical strength enabled him to spend several days in the mountains with little food and water. His observations and collections are invaluable for the plant study of this region. Juan Tomás Roig, while he was stationed at Pinar del Río and teaching at the State High School of that town, explored the mogotes, finding several new species, described later by N. L. Britton of The

Looking through an ensenada in the Mogote de la Bandera, in Viñales. A smaller mogote can be seen in the valley.

New York Botanical Garden. Julián Acuña of the Havana Experimental Station also made some collections and observations. The most famous Cuban botanist, Brother León, failed to explore the mogotes; he was only a few times near the base of the mogotes, in Viñales, Luis Lazo, and Sumidero, accompanying botanists John A. Shafer, Brother M. Victorin, W. Seifriz, and others.

One particular fact seems to indicate how few botanists have worked on the mogotes. Until a few years ago the Cuban orchid *Domingoa haematochila* was known from only two or three collections, scarcely one of them from Viñales. When I was climbing the mogotes, upon reaching an altitude of two hundred meters, more or less, I found this orchid quite abundantly from there upward to the top of the mountain and in nearly all the mogotes I climbed. A good botanist would not fail to see the orchid and at least make two or three collections of it.

These mogotes, found from Guane in the west to San Diego de los Baños in the east, are limestone mountains of very strange forms, called in Cuban geography Cordillera de los Organos, and are well separated from the rest of the mountain range of Pinar del Río, called Sierra del Rosario. The chief characteristics of the mogotes are their steep, vertical cliffs, their rounded summits, and the presence of inner, hidden valleys, called *hoyos* when they are completely enclosed by vertical cliffs, and *ensenadas* when they are open at least on one side. Some of these sink-holes have never been explored; they, as well as the numerous caves, are the places to look for fossils, mainly of land animals. There also are some underground rivers, several of which have been explored, but much remains to be done in that field. There are at least two famous hoyos, the Hoyo de Potrerito near the town of Sumidero, crossed by the Cuyaguateje River which enters and leaves through caves; and the Hoyo del Ruiseñor near the Valle del Ancón and San Vicente. One famous ensenada is the Ensenada de los Muertos in the Mogote de la Bandera near the town of Viñales. The height of these mogotes varies from a few feet to about twelve hundred to fifteen hundred feet. Pan de Guajaibón itself can be considered in many aspects as one of them, and is the highest point in Pinar del Rio and western Cuba, seven-hundred and fifty meters (about twenty-four hundred feet) above sea level. Sometimes the climber, finding himself in front of a smooth stone wall, has to look for an easier way up among the rocks, the edges of some being as sharp and cutting as knives; in other places, the famous *tibisi (Arthrostylidium capillifolium)*, a stiff grass, blocks the way with its innumerable and long stems, as tough as wire and practically impossible to cut through. To these obstacles toward the summit must be added the lack of water and the sharp dog-tooth rocks which wear away a good pair of shoes in a few hours. All this explains why the vegetation of the mogotes has been less studied than that of the Pinares.

In studying the mogote vegetation, the botanist finds plants common to all limestone soils of Cuba, many of them being found also in the other West Indian Islands, and even in all tropical America. However, on the summits and on the cliffs grow quite a number of strictly endemic plants, the product of an evolution realized in situ since these rocks emerged from the sea where they originated. These endemic species, typical of the mogotes, make this flora one of the most interesting in Cuba and have much in common with the coastal thickets, especially the limestone formations called *diente-perro* (dog-tooth) on the sea cliffs.

For convenience, I shall divide the flora of the mogotes in three main formations: 1) the vegetation at the base, where there is enough humidity and the plants are sheltered in shade, at least part of the day; 2) the vegetation of the cliffs and the summits, very dry and xerophytic; and 3) the flora of the hoyos and ensenadas. The three may intermix at the limit areas, since it is possible that a plant from one place may grow in another, the seeds being transported or just dropped.

The base of the mogotes presents some interesting plants, some of them strictly endemic, mingled with some which

are very common in all the Cuban limestone soils. At the base of the cliffs in the shaded areas, deep into the ensenadas, where the sun shines only a few minutes every day, there is still some of the natural vegetation. Here are two species of *Gesneriaceae:* one of them *Gesneria celsioides,* with shiny leaves and bright yellow flowers, the other, *Rhytidophyllum rupicola,* with red flowers in terminal spikes and velvety leaves. Two other very ornamental species are also worth cultivating, the very rare *Justicia roigii* with purple flowers; and *Anthurium crassinervium* with big, shiny leaves. The latter is very abundant and has been cultivated as an indoor plant. Found on wet rocks is *Oldenlandia callitrichoides,* with small, orbicular leaves and tiny, white flowers; also here, though quite rare, is *Phinaea pulchella* of the *Gesneriaceae.*

Among the shrubs and small trees, found in the ensenadas, are: *Amyris balsamifera, Cecropia peltata, Eugenia buxifolia,* and *E. galalonensis, Faramea occidentalis, Oxandra lanceolata, Picrammia pentandra, Piper aduncum* and *P medium, Psychotria* spp., *Solanum havanense, Tabernaemontana amblyocarpa.*

Some vines climb high among the rocks and shrubs, such as *Arthrostylidium cubense* and *A. reflexum, Fischeria crispiflora, Ipomoea fuschioides, Marsdenia clausa, Rajania psilostachya, Sicydium tamnifolium. Solandra grandiflora,*

Sharp limestone rocks form the slopes of the mogotes. Note the contrast with the valley floor.

Tournefortia volubilis, Triopteris rigida, and *Valeriana scandens.*

Among many ferns, the following are typical: *Adiantum melanoleucum, Asplenium pumilum, Pityrogramme calomelanos, Polypodium phyllitidis, Psilotum nudum, Selaginella spp., Tectaria heracleifolia.*

In wet, shady places I have found a small plant of the *Amaranthaceae,* strictly endemic in the mogotes, *Woehleria serpyllifolia,* while the ferns become more abundant: *Adiantum capillus-veneris* and *A. tenerum, Asplenium reptans,* and *A. verecundum, Anemia phyllitidis* and *A. underwoodiana, Diplazium strictum, Dryopteris scolopendrioides* and *D. reptans, Polypodium* spp., *Tectaria cicutaria.*

And also several species of *Pilea: P. haemisphaerica, P simplex, P. affinis,* and *P. valenzuelae.*

Going up the cliff, or to a few feet above the valley floor, one may observe some of the plants growing on the stone walls, some hanging from the rocks, some rising out of the darkness below, looking for light. The fleshy, verticillate leaves of *Peperomia verticillata* or, in other places, of *P. guanensis* are beautiful; *Siemensia pendula* has white flowers hanging from its woody branches, and several species of *Salmea (S. glaberrima, S. umbratilis, S. caleoides)* with *Acalypha pendula, A. mogotensis,* and *Talinum paniculatum* cover the rocks; *Marcgravia calcicola* climbs on the stony walls and reaches heights of twenty to thirty feet before bearing its flowers; *Valeriana scandens* may also reach a good altitude, and *Solandra grandiflora* shows its big, cream-colored flowers among the shrubs growing in the cracks of the limestone. *Eugenia banderensis* is quite common (its name being derived from Mogote de la Bandera, near the town of Viñales) and *Marsdenia vinciflora* is also found in that place. *Annona elliptica,* first collected by Ekman in Mogote de la Bandera, is quite abundant there. Some xerophytic plants show up even at the base—*Malpighia coccigera, Bumelia glomerata,* etc., with their characteristic spiny leaves or branches. The fleshy stems of *Philodendron wrightii* and *P. urbanianum* hang down from high up the cliff.

As one goes higher, the vegetation becomes more specialized; at some distance from the ground there is a definite predominance of fleshy plants, such as *Agave tubulata,* and several *Cactaceae,* some of them strictly endemic: *Harrisia earlei, Leptocereus assurgens, L. ekmanii* (Guane), *L. prostratus* (Sumidero), *Mammillaria prolifera, Opuntia dillenii, Selenicereus grandiflorus,* and *S. urbanianus.*

Also worthy of attention are two shrubs, *Bursera shaferi* and *Omphalea hypoleuca,* found only in this location; these two are vicarious for two other species growing on the coastal cliffs, *Bursera angustata* and *Omphalea trichotoma.* Does this mean that they are the remnants of an old coastal cliff vegetation or only an ecological similarity?

In some mogotes, the rock formation is not so steep and slopes gradually to the level of the valley floor. Without climbing all the way up, I have been able to observe some of the typical plants of the mogotes; in fact, some of them are not found in the higher positions: *Casasia calophylla, Ehretia tinifolia, Cuervea integrifolia, Plumeria obtusa, Strychnos grayi, Tecoma stans,* and *Vitex divaricata* var. *cubensis.*

Lobelia cubana is found near the base of the mogotes, al-

ways growing on rocks, although its type locality is the top of Pan de Guajaibón; on the walls inside the ensenadas are *Neoregnellia cubensis* (very rare), *Ficus perforata, Bumelia celastrina,* and *Ginoria americana.*

When the botanist reaches the summit of a mogote, his effort is very often rewarded by finding some rare plants, no two mogotes being completely alike. There are always some species which were not previously observed in other places, and sometimes a new species. Some plants growing on top of the mogotes are quite conspicuous and can be observed from the valley floor; these are generally better known and, in some places, are readily accessible when the road crosses between low mogotes, as happens at Puerta del Ancón and near Baños de San Vicente. These plants are mainly *Gaussia princeps* and *Thrinax punctulata.* The former is a robust palm six to ten meters high, very thin near the top, and called *Palmita de Sierra;* the latter palm, *Guanito de Sierra,* is smaller and is used by the farmers to thatch their houses. Outstanding against the bright tropical sky is *Spathelia brittonii* of the *Rutaceae,* resembling a tall tree-fern. It bears rose-purple flowers in a large, terminal inflorescence more than two meters long, and the fruits keep more or less the same color for weeks. This plant blooms only once in its life. Rooted in the cracks of the rocks, and always in very exposed situations, grows the *ceibon, Bombacopsis cubensis:* its bottle-shaped, green trunks stand out clearly on the face of the cliffs, or against the clear blue sky.

By following one of the paths made by the *campesinos* in the mogotes, a botanist is able to study the primeval vegetation of these limestone mountains. It is not rare to find hardwood trees, *Cedrela mexicana, Diospyros caribaea, D. crassinervis. Mastichodendron foetidissimum.* and others of a big size, since they have never been exploited because of the inaccessibility to their location.

In spite of water scarcity many different plants thrive on the highest parts, where there is soil in the holes of the rocks; they have become adapted to the environment. During the rainy season, water accumulates in the holes, and trees and plants can fully develop. During the dry season, they usually lose their leaves and are dormant. The more typical are: *Bernardia dichotoma, Bursera simarouba, Callicarpa shaferi, Celtis iguanaea. Ceratopyxis verbenacea. Croton corylifolius, Drypetes alba, D. lateriflora, D. mucronata, Eugenia galeata, Forestiera rhamnifolia, Gyminda latifolia, Gymnanthes lucida, Lantana strigosa, Maytenus buxifolia. Plumeria obtusa, Rapanea guianensis,* and *Torrubia obtusata.*

The complete list would be very long, for the plants growing on limestone are common to all limestone soils in Cuba, with a few strictly endemic species. Most of them are conspicuously xerophytic or have developed some system of defense against lack of water. Among the most adaptable are the bromeliads, which store water in their leaves shaped like a cup; on the crests, they are found in great quantities, either on rocks or epiphytic. The most common species is *Hohenbergia penduliflora,* with large leaves and long, hanging inflorescences; also well represented are the genera *Catopsis, Guzmania, Tillandsia,* and *Vriesea.* On certain summits, *Agave tubulata* with fleshy leaves and long, erect inflorescence of yellow flowers, is dominant. Also quite fleshy are the vinelike *Philodendron lacerum* and *P. krebsii.*

Following is a list of the plants growing on the summits, those with an asterisk are endemic in this formation: **Actinostemon brachypodum. *Ancistranthus harpochiloides. *Anthacanthus purpurascens, *Ardisia mogotensis. *Anerodendron martii. *Callicarpa shaferi, *Calyptranthes enneantha, *Calyptranthes protracta, *Casasia calophylla, Clerodendron cubense, *Clusia brittonii. *Cnidoscolus bellator, *Cordia lenis, Croton eluteria, *Euchorium cubense* (very rare), *Eugenia loeseneri. *E. mogotensis,* and **E. tomasiana, *Eupatorium pseudo-dalea, *Gochnatia montana, *Gouania ekmanii. *Guettarda brevinodis, *G. calcicola *Helicteres calcicola, *Ipomoea arnoldsonii. I. fuschioides, *I. robusta. *Matelea tamnifolia, *Pavonia achanioides, *Phialanthus stillans, *Psidium scopulorum, *P. tomasianum, *Reynosia revoluta, *Salmea glaberrima, Strempeliopsis strempelioides.* and **Vernonia aronifolia.*

Among the grasses found on the mogotes are *Muhlenbergia parviglumis* and *Triodia eragrostoides;* both of them also grow in Mexico and Texas.

Apart from a few endemic species, the variety of plants in the hoyos is not as numerous as on the summits or on the cliffs; this vegetation is very similar to that of the limestone forests, with species common to nearly all the Antilles, at least the Greater Antilles. I give here an abbreviated list.

The endemic species are: *Ekmanianthe actinophylla, Bourreria polyneura, Casasia calophylla, Erythrina cubensis, Eugenia galeata, Tabebuia sauvallei. T. calcicola.*

Among the plants common to all limestone soils and rocks are: *Ateleia apetala, Casearia aculeata, C. guianensis,* and *C. hirsuta, Cedrela mexicana, Celtis berteroana, Cnidoscolus rangel, Cupania americana. Dendropanax arboreum. Diospyros crassinervia. Erythrina grisebachii* and *E. velutina, Erythroxylon areolatum* and *E. havanense, Faramea occidentalis, Ficus perforata, Huertea cubensis, Juglans jamaicensis. Ocotea leucoxylon, Oxandra lanceolata, Picramnia pentandra, Pilocarpus racemosus. Prockia crucis, Savia erythroxyloides* and *S. sessiliflora, Nectandra coriacea, Terminalia intermedia, Zamia latifoliolata, Zuelania guidonia.*

Much work, of course, remains to be done in such an interesting area, and probably some unknown species await discovery. Also, there are many little-known species deserving to be collected again and to be studied further. Scientific observations on the plant succession and climax have never been made—an example of how little we know about this most interesting and picturesque region. I hope to be able to explore it again in the future.

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EVENTS AT THE NEW YORK BOTANICAL GARDEN

(For detailed information about a particular event or course, write or phone LU 4-8500)

THEATRE BENEFIT—"PICKWICK," English musicale produced by David Merrick and starring Harry Secombe, under auspices of Advisory Volunteers, on November 4, 1965.

"A GARDENER VISITS SOUTH AMERICA," illustrated Saturday Afternoon Lecture by T. H. Everett, on November 6, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

CHRYSANTHEMUM SHOW IN THE CONSERVATORY —November 7-21, 1965.

"FLOWERS OF ICELAND AND GREENLAND," illustrated Saturday Afternoon Lecture by Dr. William C. Steere, on November 13, 1965, at 3:15 p.m. Auditoruim of the Museum Building. Preceded by a half hour of recorded music.

"BOTANIZING AROUND THE WORLD," illustrated Saturday Afternoon Lecture by Dr. Pierre Dansereau, on November 20, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

"NEW YORK IS A WONDERFUL STATE," illustrated Saturday Afternoon lecture by E. Dorothy Swindells, on November 27, 1965, at 3:15 p.m. Auditorium, the Museum Building. Preceded by a half hour of recorded music.

"FLOWERS OF THE CLOUDS: YOSEMITE, GLACIER, MT. WASHINGTON," illustrated Saturday Afternoon Lecture by Alice and Glenn Foss, on December 4, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

HOLIDAY TOUR of houses and apartments in the East 70's, New York City, sponsored by the Advisory Volunteers of The New York Botanical Garden, on December 9, 1965. Morning session, 10:30 a.m.-1:30 p.m.; afternoon session, 2-5 p.m.

CHRISTMAS SHOW IN THE CONSERVATORY—December 11, 1965-January 9, 1966.

"GARDENS FROM MONTE CARLO TO LISBON," illustrated Saturday Afternoon Lecture by Dorothy Loa McFadden, on December 11, 1965, at 3:15 p.m. Auditorium of the Museum Building. Preceded by a half hour of recorded music.

SATURDAY AFTERNOON NATURE WALKS continue through December 18, 1965, and resume on March 12, 1966, through June 25, 1966. Starting point, Museum Building. Leader—Eleanor Yarrow.

ILLUSTRATED LECTURES on January 6, 13, 20, 27, 1966, at 11 a.m., in the Cosmopolitan Club. For details, see insert this issue.

TREES AND SHRUBS IN WINTER (winter term) —10 a.m.-12 noon. Starts January 8, 1966, Museum Building. Instructor—Eleanor Yarrow.

APPLIED ECOLOGY (winter term) — Monday morning class, 10-11:30 a.m.; Monday evening class, 8-9:30 p.m. Starts January 10, 1966, Museum Building. Instructor—Dr. Pierre Dansereau.

FLOWER AND VEGETABLE GARDENING (winter term) — Thursday morning class, 10-11:30 a.m.; Thursday evening class, 8-9:30 p.m. Starts January 13, 1966. Museum Building. Instructors—Paul F. Frese and James M. Gibb.

Admission to Saturday Afternoon Lectures, 25 cents, free to members of the Garden (upon presentation of membership card).

Nature Walks, fee $1.00 per person.

For fees of the various courses, see the Educational Program.

NEWS, NOTES and COMMENTS

A Professional Horticultural Exploration of England and Scotland, sponsored by The New York Botanical Garden, has been planned for the period of June 9-30, 1966. This is going to be a unique opportunity for professional horticulturists to participate in a horticultural travel adventure. They will meet the directors, prinicipals, and staff members of some of the leading British horticultural institutions, botanic gardens, parks, schools, universities, nurseries, and estates. Among the places to be visited are the Royal Botanic Gardens at Kew, the Royal Horticultural Society's Gardens at Ripley in Surrey, Windsor Great Park, Sunningdale Nurseries in Windlesham, Hillier and Sons Nurseries in Winchester, Bressingham Nursery at Diss Norfolk, Rochford's Nursery at Hoddesdon, Herts., the gardens of Mr. and Mrs. Martin Simmons at Burghclere, of Mr. and Mrs. Anthony de Rothschild at Wing; and in Scotland, the Royal Botanic Garden in Edinburgh and the gardens of Keillour Castle (Major and Mrs. Knox-Finlay) at Methven, of Logan Gardens at Stransraer, and of Lochinch Castle (Earl of Stair).

The group is limited to the number that can be accommodated in one medium-sized coach. The leader will be T. H. Everett, Assistant Director (Horticulture) and Senior Curator of Education at The New York Botanical Garden. He will be assisted by an experienced British courier.

Tour rates, double room, $976 per person; single room, where available, $1,056 per person. A deposit of $200 is required with each registration, the balance payable before April 20, 1966. Complete details may be had from Floral and Travel Ltd., 730 Fifth Avenue, New York, N. Y. 10019.

The New York Botanical Garden Award, administered by a committee appointed by the President of the Botanical Society of America, was awarded jointly this year to two botanists of the University of Texas, Austin—Dr. Ralph E. Alston and Dr. B. L. Turner. They were selected as recipients of this Award because of

Prize-winners were congratulated by Dr. William C. Steere, Director, and Mrs. Steere after the Children's Gardencraft graduation exercises this fall. The youngsters were honored for unusually well-kept gardens or exceptional yields in the Children's Gardens at The New York Botanical Garden, in which ninety plots are worked by one hundred and eighty children. Prizes were given to twenty-two children.

their pioneer work in the field of biochemical systematics. Their book, bearing the title of *Biochemical Systematics,* has recently been published.

Gift to the Library. Elizabeth C. Hall, Associate Curator of Education, received from Myra J. Tyler of Yonkers, New York, a letter written by Ralph Waldo Emerson to Mrs. Tyler's grandfather, John R. Wiltsie.

This letter is of interest and value not only because it is written by Emerson's hand, but because mention of the planting of pear trees and reference to Andrew Jackson Downing give it historical horticultural importance. Miss Hall has presented the letter to the Garden's Library for safe-keeping in its biographical archives.

The letter follows:

Concord, 21 November, 1850

My dear Sir,

I was surprised night before last by the arrival of a bundle of pear trees, all equipped, packed, and protected as for long travel. I studied the label well, and found they were truly meant for me, but let them lie overnight in the cellar for better assurance.

Yesterday the mail brought me your note, which gave the greatest pleasure. This morning I have had three holes dug, or "borders prepared" as Mr. Downing prefers to say,—with a faithful following of his notes, excepting that I add a little manure,—(which he does not praise, but my pears do,—) and my good Irishman and I have put them severally in the best places I could choose, and, as the weather is still fine, they have a very fair beginning. They have come in perfect order, and the kinds are all new prizes to me. I cannot tell you how much pleasure these three fine townsmen of yours bring to me. I shall cherish them tenderly, and hope, that by the time they get fruit on their boughs, your occasions will bring you this way, and you will come in and look after them. I assure you I have the kindest remembrances of your good fellowship in our pleasant journey in the spring and summer; and it is very kind of you to add new obligations to my old ones.

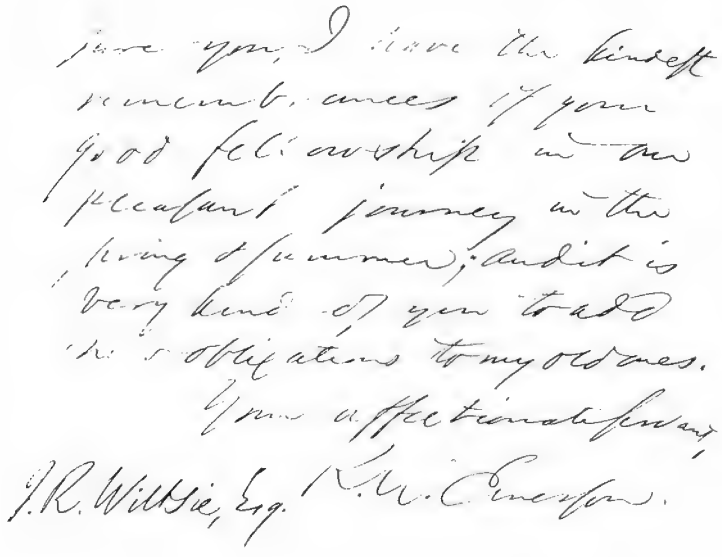
Your affectionate servant,
R. W. Emerson

J. R. Wiltsie, Esq.

Some sixteen thousand people gathered on Daffodil Hill in The New York Botanical Garden on August 14 and 28, 1965, to listen to concerts given by the New York Philharmonic.

Lottery for Vines in the United States. Among the interesting additions to the holding of documents, related to the history of botany and horticulture, in the Library of The New York Botanical Garden is the notice of "Scheme of a Lottery for the Cultivation of Vines in the United States, authorized by an Act of the Legislature of the State of Pennsylanvia to be drawn in the City of Philadelphia, the 29th of October 1810." Mrs. Byron Stookey, a member of the Advisory Volunteers, found the notice among some family papers of the eigtheenth and nineteenth centuries and presented it to the Garden.

From Hendrick's *History of Agriculture in New York State* (1933) we learn that: "In lieu of subscription lists, community chests, and campaigns for raising money in the last years of the Colonial period and for some sixty or seventy years after, in all of the colonies and states, money for semi-public purposes were raised by lotteries, not only in cities and towns, but by



THE NEXT LOTTERY

THAT WILL BE DRAWN IN THE *UNITED STATES.*

SCHEME OF A LOTTERY FOR THE

CULTIVATION OF VINES,

IN THE UNITED STATES;

Authorised by an Act of the Legislature of the State of Pennsylvania, to be drawn in the City of Philadelphia, the 29th of Oct. 1810.

		Dolls.		Dolls.
1	Prize of	12,000	12	12,000
1	"	8,000	"	8,000
1	"	4,000	"	4,000
2		2,000		4,000
1	"	1,500	"	1,500
8	"	1,000		8,000
10	"	500	"	5,000
10		300	"	3,000
12	"	200	"	2,400
30	"	100	"	3,000
100	"	50	"	5,000
200	"	20		4,000
3000	"	5		15,000
3,578	Prizes			90,000
14622	Blanks			
18,000	Tickets at 5 Dollars each.			

PART OF THE CAPITALS TO BE DETERMINED AS FOLLOWS,

			Dolls.
First drawn Number on the	5th day		500
do.	do.	10th	500
do.	do.	15th	500
do.	do.	20th	1,000
do.	do.	25th	1,000
do.	do.	30th	1,500
do.	do.	35th	2,000
do	do	40th	4,000
do.	do.	44th when only 200 Tickets	8,000

are in the Wheel, the First drawn number to be a prize of

Prizes subject to a deduction of 15 per cent.

states, and in the period just after the Revolution by the authorization of state and federal governments. Thus money was raised for court houses, town halls, bridges, turnpikes, either to build new or for repairs. Salaries were sometimes raised by the sale of lottery tickets. Churches and colleges resorted to lotteries when money was needed. The lottery mania raged from 1790 down to the Civil War, and then was gradually abandoned except in the case of the Louisiana Lottery, which continued until 1890 when the federal authorities forbade it the use of the United States mails. Advertisements for lotteries furnished prime support to newspapers. . . ."

"The Good Old Days." Henry de la Montagne, Assistant Director Emeritus, in looking through the Garden's archives, came upon a letter Dr. Nathaniel Lord Britton, then Director of The New York Botanical Garden, addressed to the President of the New York Central and Hudson River Railroad Company, on June 30, 1899. Dr. Britton requested that the name of the railroad station be changed from Bedford Park to Botanical Garden and that "a change in the rate of fare to and from the Garden [be made] so as to compare favorably with the fare by trolley lines."

"A visitor," Dr. Britton continued, "can come to the Garden from Manhattan and return by trolley for sixteen cents; and if the New York Central wants its proportion of the traffic it would seem as if the fare from Grand Central Station and back (which is now 25 cents) should be materially reduced."

Dr. Britton also asked that "an underground passage under the tracks be constructed in place of the present overhead bridge." Mr. Callaway's reply is published here.

New York Central & Hudson River R. R. Co.
Grand Central Station.

S. R. Callaway,
President.

G. New York, July 5, 1899.

Mr. N. L. Britton,
Director-in- Chief, N.Y. Botanical Garden,
Bronx Park, New York City.

Dear Sir:

I have your letter of June 30th. We have a great deal of new work on ~~for~~ hand this year and will not be able to build a new station at Botanical Garden, but will endeavor to do so next year. I have asked our General Superintendent to change the name of the station to Botanical Garden. We do not think that the fare is excessive, considering the distance and the service performed.

Yours truly,

S. R. Callaway

Activities of the Director and Staff. Dr. William C. Steere, Director, attended the meeting of the New York State Council on the Arts, held at Cooperstown, New York, on September 9, 1965; the bicentennial celebration of the Smithsonian Institution, in Washington, D. C., September 16-18, 1965; some of the sessions of the Triennial General Conference of the International Council of Museums, held in New York City, September 22-October 3; the meeting of the Board of Trustees of Biological Abstracts, of which he is President, held in Ottawa, Ontario, Canada, October 7 and 8, 1965; the twentieth American Horticultural Congress, held at Callaway Gardens, Pine Mountain, Georgia, October 13-16. From October 22-November 6, 1965, Dr. Steere has been one of the leaders on the Garden's Guatemala Tour.

Dr. Pierre Dansereau, Assistant Director (Botany) participated in "Les Recontres de la Cascapédia, Troisième année." This panel discussion on "Conflicts et dialogue des humanismes" was held at Stanley House, New Richmond, P. Q., Canada, in August, 1965. He was Codirector of the eighth seminar, sponsored by Canadian Union of Students, which was held at the University of New Brunswick, Fredericton, New Brunswick, Canada, September 6-11, 1965. The topic was "La démocratie à l'université." Between these two events, Dr. Dansereau engaged in field work in the Gaspé in collaboration with research assistants Peter F. Buell and Hyrum Johnson.

Dr. Harold W. Rickett, Senior Curator of Botany, reports "more travels—this time a non-botanical vacation in California and Arizona during August. I explored the west fork of Oak Creek on a three-day trip, partly wading and partly swimming—with full packs. Lush mesic forest, many wild flowers, and many photographs. In October I was in Ipswich, England, working with the printers on the final proofs of the first volume and the first proofs of the second volume of the Wild Flower Series, and in Utrecht consulting on matters concerned with the International Code of Nomenclature."

Dr. Caroline Allen, Research Associate, left on September 5, 1965, for field investigations in the *Lauraceae* in Trinidad and Tobago, from which she returned the latter part of October.

Dr. P. P. Pirone, Senior Plant Pathologist, appeared on the Peter Lind Hayes-Mary Healy program on WOR radio to talk about the Garden-sponsored tour to Guatemala. Many listeners telephoned or wrote for additional information on the tour. On October 1, 1965, Dr. Pirone presented the principal address at the first annual meeting of the newly formed American Society of Municipal Arborists. His subject was "Disease Incidence in Ornamental Trees as Affected by Climate and Other Factors."

Dr. Annette Hervey, Senior Research Associate, attended the meetings of the American Institute of Biological Sciences at the University of Illinois, Urbana, in August. Thereafter she went to Indianapolis, where she had been invited to make an extensive tour of the laboratories of the Eli Lilly Company.

Jablonski's Type Hunting Trip to Europe. I left New York on August 12, 1965, and returned September 22, 1965, during which time I visited the botanical institutes in Cracow, Vienna, Budapest, Paris, and Hamburg, making special studies of the botanical gardens of the last two cities.

The contrast of those gardens with our own New York Botanical Garden is tremendous. The much greater number of skillful laborers, the much more appreciative and more lawful behavior of the public, a much more temperate climate, and less aggressive weeds are striking.

The herbaria of Budapest, Vienna, Paris and Hamburg were visited mainly for the purpose of establishing the availability of types of species of *Euphorbiaceae*, at present under investigation in New York.

Most of the types described in the Pflansenreich were destroyed in Berlin during the war. Duplicates, however, were distributed to smaller herbaria and, to my great surprise, many are available in Vienna and Budapest. It will be necessary to revisit these places and make a thorough search.

Many duplicates were available in Hamburg before the war. The sad story of these is as follows: To save them from bombardment, they

were shipped to Leipsig where they were effectively stored in bomb-proof shelters and survived, only to be the prey of occupying Russian forces. The Russians decided that no valuable scientific material should be left to the Germans, so instead of returning the collections to their original locations, they sent them to Petrograd where they are supposedly embodied in the herbarium of Komarov Institute. All efforts by Hamburg to regain them were without success. Only undistributed collections of Brazilian material of Ule and Bolivian material of Buchtien have been saved, and these are now being ordered and arranged.

In Paris, apart from the rich collections of Glaziou from Brasilia, many specimens collected in the Upper Orinoco have been located in the historical Humboldt collection. Less material originating from Guayana have been found in the Lamarck, Jussieu, and Baillon collections. E. J.

American Iris Society will meet again in the East under the auspices of Region 19—on May 28-June 1, 1966, with headquarters at the Hotel Robert Treat, Newark, New Jersey.

Two of the gardens to be visited are described as "private gardens with regional interest," both of which are new since Region 19 was host to the Society in May, 1961. One is the garden of Mr. and Mrs. Melvin Leavitt in Whitehouse, New Jersey, which they have made available as a regional display garden. The season of 1965 showed excellent results, for Mr. Leavitt's cultural techniques are outstanding: his own beds of irises and the display beds are immaculately kept and the plants vigorously grown.

The second service garden is that of Mr. and Mrs. John Juhasz in Bound Brook, New Jersey, and also new since the 1961 A.I.S. convention. The acre of iris beds, cleared from the surrounding woodlands, were ready when Rutgers University abandoned its beds of historical irises, and Mr. and Mrs. Juhasz agreed to take the most significant historical irises and grow them as a service to Region 19.

These two gardens, as well as the other gardens on the tour, including the Presby Memorial Garden in Montclair, New Jersey, the garden of Dr. and Mrs. Fred Knocke in Readington, New Jersey, and the garden of Mr. and Mrs. Kenneth Smith on Dongan Hills, Staten Island, will have beds of guest irises from hybridizers Fred W. Cassebeer, Gordon Plough, David Lyons, W. B. Schortman, Neva Sexon, the Schreiners, Arthur and Ed Watkins, and many others.

The American Iris Society was organized at The New York Botanical Garden on January 29, 1920, and in May of that year the Society's first test garden was established under the guidance of the late Mrs. Ethel Anson S. Peckham, who did much of the planting with her own hands. In 1926 she supervised the replanting of the test garden to provide beds for testing Dr. John K. Small's collection of native iris for winter hardiness in this climate.

Hybrid Tea Rose 'Hallmark'. For over one hundred years rose breeders have unsuccessfully tried to combine fragrance with disease-resistance in red hybrid tea roses. This has now been accomplished. The new hybrid tea rose 'Hallmark', originated by Dr. Dennison Morey, President of General Bionomics, which was featured at a recent New York exhibition at the Hallmark Gallery, possesses this highly desirable combination. Dr. Morey says, "Heretofore all fragrant, red hybrid tea roses have been susceptible to foliage disease, especially mildew. 'Hallmark', which displays almost complete immunity to mildew and an unusually high level of resistance to blackspot and rust, represents an important milestone in the development of garden roses. Its value in hybridizing is probably as great as that established by such parents of the past as 'Frau Karl Druschki', 'Ophelia', 'Signora', 'Charlotte Armstrong', and 'Peace'."

This exciting new rose is being distributed by Jackson & Perkins Company of Newark, New York.

A New Director for the Norfolk Botanical Garden. George W. Baker, a graduate of Michigan State University with a degree in landscape architecture, will succeed Frederic Heutte as Director of the Norfolk Botanic Garden. Since 1957, Mr. Baker has had charge of the build-

Fire destroyed a service building and the contents of four connecting greenhouses in the Propagation Range the night of September 7, 1965. There was strong evidence that the blaze was set by arsonists, probably a teen-age band which had been plaguing the Garden during the preceding year. Previously numerous smaller fires had appeared to be vandal-set. Moments before he discovered the flames, Jim Flynn, a Garden guard, saw and chased a group of ten youths. Included in the service building losses were machines — a rotary power screener, two soil shredders, two sprayers, a soil sterilizer, and a fogging machine — and hand tools.

Intense heat seared these one thousand poinsettias and, in an adjacent house, about a thousand chrysanthemums, all scheduled for use in the Chrysanthemum and Christmas Shows, November 7-21, 1965, and December 12, 1965-January 6, 1966. "Fire damage notwithstanding," Horticulturist Louis Politi said, "the shows will go on." A search for new sources of poinsettias was under way within hours of the fire. The fire and its cause was given widespread publicity in the New York area radio and press, with strong editorial comment from *The New York Times* and *The Daily News* and picture coverage in all the daily newspapers and on all major television channels. Widely quoted was a statement by Dr. William C. Steere, Director, calling for more city-supplied guards — "The great jewel robbery at the American Museum of Natural History and attacks against the animals at our neighbors, the Bronx Zoo, and other instances. The City must protect its cultural heritage."

Rare, difficult-to-replace plants were among those in this propagating pithouse, ravaged by searing heat which blasted into the greenhouses from the burning service building. The building and greenhouses will be rebuilt. Planning is also under way for better future protection of the gardens, grounds, and building.

ings and grounds at the University of Michigan, and Dearborn Center including Fairlane Estate, the former home of Henry Ford. For the previous four years he had his own landscape and nursery service; upon graduation in 1949, he served as landscape designer for several Ohio nurseries. Mr. Baker is thirty-eight years old, married and the father of a daughter.

Mr. Heutte has been Director of the Norfolk Botanic Garden since its beginning in 1958. He was Park Commissioner of the City of Norfolk from September 1936 to January 1958.

After January 1, 1966, he will continue as Garden Editor for the *Norfolk Ledger-Star* and possibly carry on his five-minute radio program six days a week. He has aspirations of writing a book, but plans to devote most of his time and energy to promote a gardening school to serve American gardens and parks, this school to be patterned after a European system, modified to meet conditions in this country. Mr. Heutte hopes that such a school will be initiated at the Norfolk Botanical Garden in the near future. In his spare time he will take care of his acre garden which remains his "proving ground."

Torrey Botanical Club opened the fall season with a visit to Sterling Forest Gardens on October 2, 1965. The program included a field trip to a cedar bog, led by Dr. Calvin J. Heusses, Adjunct Professor of the Biology and Geology Departments of New York University, and a tour of the gardens.

On October 19, 1965, Dr. John A. McLaughlin of Fordham University addressed the club on "Factors Influencing the Productivity of Plankton in Polluted and Non Polluted Waters" in the Campus Center at the University.

The meetings scheduled for November and December are: November 16, 1965, "The Physiology of Plant Cell Enlargement" by Dr. David Baker of Rutgers University; December 7, 1965, "Time, Temperature, and Tumors—A Study in Crown-Gall Tumorigenesis" by Dr. Jacques Lipetz of Manhattan College; December 21, 1965, "Protein Synthesis During Seed Germination" by Dr. Alva A. App of Boyce Thompson Institute for Plant Research. These meetings will be held at 8:15 p.m. in Schermerhorn Extension, Columbia University.

Edible Nut Production is a new correspondence course offered by The Pennsylvania State University. Chestnuts, walnuts, hickories, hazels, and filberts are dealt with, their soil and fertilizer requirements, disease and insect controls, propagation and grafting. Improved varieties are listed and described.

Author of the course is William S. Clarke, Jr., Professor of Pomology at the University and the Secretary of the Northern Nut Growers Association.

To enroll, send name and address, with $2.75 to cover fee, to Edible Nuts, Box 5000, University Park, Pennsylvania 16802.

Takeo Sakata of Yokohama, Japan, received the silver medallion and plaque of All-American Selections for distinguished achievement in horticulture at the Internationl Flower Seed Conference at Pennsylvania State University in August, 1965. He is the first overseas recipient of this award.

For every twenty years his firm, T. Sakata and Company, held monopoly on all-double petunia seeds, because no other plant breeder knew his method of breeding. His all-double petunia 'Victorious' won the All-America Selections award of merit (since reclassified to silver medal) as a 1934 introduction in North America.

Since then Mr. Sakata's entries (for snapdragons, celosias, Sweet William, garden pinks, pansies, petunias, and savoy cabbage) have won six other silver medals and ten bronze medals.

Dr. John Seeley, Professor of Horticulture and Head of the Department of Floriculture and Ornamental Horticulture, Cornell University, received the S.A.F. Foundation for Floriculture Award. The presentation took place at the eighty-first annual convention of the Society of American Florists, held at Miami Beach, Florida in July, 1965.

Dr. Seeley has made substantial contributions both in education and research in horticulture, and has published papers on a variety of subjects including fertilization, nutrition, watering, and other technical factors involved in plant growth. He has also contributed extensively to the work of the American Society for Horticultural Science and the American Association for the Advancement of Science and served as the first United States chairman of the Glasshouse Crop Committee of the International Society for Horticultural Science.

Bailey Medal Awarded to Dr. Steere. At the Awards Dinner of the twentieth American Horticultural Congress, the Liberty Hyde Bailey Medal of the American Horticultural Society was awarded to Dr. William C. Steere for:

"Your outstanding work as a teacher of botany and biology, for your thoughtful direction of graduate-student planning and research programs, for the guidance and leadership you have clearly given to the various collegiate departments you have headed and the renowned institution you are presently directing, as well as the national and international organizations you have served as president, for your studies of bryophytes of the Arctic and Antarctic regions of the world, and for the sound contributions you have made, by writing and fulfilling editorial responsibilities, to our present botanical knowledge."

The American Horticultural Society awarded Dorothy Ebel Hansell a citation for the "generous giving of her wide knowledge of and experience in horticulture to many national organizations. As a former publisher, and currently as editor, author, advisor, and friend, she has helped many an organization in making its publication more valuable to the gardening public."

Others to receive citations were Mary Henry Gibson of Gladwyne, Pennsylvania, for special services to horticulture; Dr. George L. Slate of Geneva, New York, for breeding of small fruits; Dr. Rupert B. Streets of Tucson, Arizona, for his studies of diseases of fruits and ornamentals; and George B. Park Seed Company of Greenville, South Carolina, for ninety-six years of service in the flower seed business.

Mrs. Hansell was elected a director of the American Association of Botanic Gardens and Arboreta at its annual meeting held during the Congress and appointed a director of the Garden Writers' Association of America by the newly elected president, Barbara Emerson. Mrs. Emerson is editor of the publications of Amchem Products, Inc.

The well-planned program attracted a registration of over three hundred and fifty members of the American Horticultural Society, American Association of Botanic Gardens and Arboreta, and Garden Writers' Association of America from twenty-four states and Canada to Callaway Gardens, Pine Mountain, Georgia, October 12-16, 1965. Considerable interest was stimulated in the International Horticultural Congress which will be held in the United States—for the first time—in August, 1966, at the University of Maryland.

(Continued on page 270)

Frederic Heutte talks with George W. Baker, who will succeed him as Director of Norfolk Botanical Garden.

Several months ago — in May, 1965 — Mrs. Kitty Simpson found a little quail in the vegetable garden on her property, which is located on a busy street in Shreveport, Louisiana, a city of some one hundred and eighty thousand people. Mrs. Simpson brought the bird, which she has since named Rebecca, into her home. It has become tame and a great pet. "Whom else do you know," she asked the Editor of *The Garden Journal*, "who writes an article with a quail riding on the typewriter? Rebecca also uses an ash tray on the work-table in which to lay an egg and weighs herself on the postage scale."

Simon, Rebecca's mate, obtained from a dealer in game birds, is also becoming tame but he lacks her personality. "Quails are smart birds," says Mrs. Simpson. "They have to be to survive mowing machines, the hunter's guns, and such natural enemies as the fox and the weasel."

BOOK REVIEWS

SPORES — FERNS. MICROSCOPIC ILLUSIONS ANALYZED. VOLUME 1. Varied Plant Groups Introduce True Ferns Through Spore Tetrad Structure. Hires, Clara S. xxiv, 548 pages, illustrated. Mistaire Laboratories, Millburn, N. J. 1965. $22.50.

This handsomely and lavishly illustrated book may be read at several levels, depending on the reader. The specialist on spores, whether fossil or modern, and the person with a special interest in ferns will find it very helpful in visualizing the complex structure of the spores of ferns and related plants, and in providing an additional tool for identifying or confirming the identity of ferns. Every botanist, whether he has a particular interest in ferns or not, will enjoy the magnificent photographs of spores and the plants which produce them, and he will also gain a better understanding of spore development and maturation. Even the person who has the most casual interest in plants will be fascinated by the artistic forms, ranging from beautiful to bizarre, shown in the many photographs (taken under very high magnification) of fern spores and related structures. As the subtitle indicates, the author feels that even the specialists on spores have gone astray in their interpretations of spores and their markings, and one of the primary purposes of this book is to elucidate and to interpret the shapes of spores and of tetrads, as well as the markings on and in them, with especial attention to the radically different appearances shown by spores when viewed from different angles. This is a highly original book, in which the author never hesitates to share her experience, observations, and techniques with the reader.

William C. Steere

THE ORIGIN OF SPECIES. Guyénot, Emile. 148 pages, illustrated, indexed. Walker and Company, New York. 1964. $3.50.

Infusing his own knowledge, philosophy, and interpretation, Guyénot abstracts the latest scientific information and conclusions regarding the major areas in evolution. The reader must therefore be acquainted with the work of pioneers who have woven milestones into the fabric of evolutionary science. He must have a background of the history of science, especially of developments during the past decades, which include Oparin, Kornberg, Miller, and others. Furthermore, a better than basic knowledge of biological processes and terminology is expected, lest the book be difficult to comprehend, especially the chapters on genetics.

This attack of the problem makes reading pleasurable for the well-informed, since it eliminates tedious explanations, always aiming directly at the bull's eye of the target. The author offers tantalizing questioning of the assumption that life arose only once, eons ago in the Watson-Crick organic soup. If conditions were favorable for one spontaneous generation, could this not have happened several times or even many times at different places with the survival of at least a few such "animated molecules"? And would this not provide the basis for a polyphyletic origin of organisms despite certain fundamental similarities of organization within several groups of animals and plants?

Guyénot decries the acceptance of Haeckel's biogenetic law. The resemblance of developing stages of vertebrate embryos may well signify kinship, but not affiliation. He presents Lamarck's theory of the inheritance of acquired characters in bright and sharp focus so that its fallacies may readily be understood. At the same time he credits Lamarck as being the pioneer who presented an authentic doctrine of evolution.

The author batters quite effectively the fortress of conservative phylogeny, leaving the reader with the uneasy feeling that he has to unlearn many concepts, and that he ought not to shake his cosy house of cards too vigorously. Guyénot's progressive attitude is designed to rouse us out of our status quo, our blissful and comfortable lethargy. He sees nothing unusual in the discontinuity of evolution where intermediate types almost never exist. Evolution, he claims, is not on a continuing basis of slight and favorable variations, but rather depends on the almost as frequent mutations, large or small, some of which survive the hostility of the environment and ultimately result in new species.

A large part of the volume is dedicated to the dissection of all aspects of genetics. It seems to me that the author elaborates on those which he can favor in presenting opposition to some of Darwin's widely accepted principles. The book appears to be deliberately designed to arouse controversy on a highly scholarly level of interpretation which is through many of the pages a studied challenge. The reader is left with a nagging impression that Darwin becomes more remote at a quickened pace, and that his glamor is gradually overshadowed by the rapid strides of biochemistry and molecular biology which received their impetus with the electron microscope. *The Origin of Species* is a fascinating little volume which ought to be read by every serious biologist and by every cultured person.

Herman F. Becker

THE GENERA OF FLOWERING PLANTS. J. Hutchinson. 516 pages, indexed. Oxford University Press, New York. 1964. $20.20.

Most American herbaria, as well as those in the rest of the non-British world, use the taxonomic system of Engler and Prantl. The sequence of Bentham and Hooker is used by systematists almost exclusively in the United Kingdom, but their *Genera Plantarum*, published between 1862-1883, is much out of date. In this

volume, the first of ten, Hutchinson has offered the products of many years of devotion to his goal of bringing Bentham and Hooker's work up to date. It is an enormous undertaking and an important one, especially since this system is surely much nearer to the probable course of evolutionary history than is the prevailing one of Engler and Prantl.

The introductory section includes really fascinating accounts of the life and work of both George Bentham and Joseph D. Hooker. There, too, one finds a statement of the assumptions which underlie the new sequence of orders and families. The initial separation of woody from herbaceous forms is still, as might be expected, a fundamental one.

Descriptions of families are followed in each case by discussion of geography, citation of anatomical literature, and a summary of the important literature concerning each family. Then follow rather novel sections: (1) rule-of-thumb notes to help the reader who recognizes a family without having much knowledge of the constituent genera; (2) a discussion of the author's philosophy underlying his arrangement of the genera; (3) a description of the geographic distribution of the genera concerned and (4) when possible, their relationships with fossil forms.

Genera of the Magnoliales, Annonales, Laurales, Dilleniales, Coriariales, Rosales, and Leguminales are included in this first volume. Individual generic descriptions are brief, often so much so that generic separation is not entirely clear.

An index to economically important genera and properties, and another index to the names of orders, families, tribe, and genera conclude the work.

Having indicated the many commendable aspects of this important publication, the shortcomings must in all fairness also be pointed out. Most serious to taxonomists, at least potentially, is the indication of lectotypes for genera without any suggestion of whether these are the author's choices or from the published works of monographers. This is not to say that lectotypes *have* been chosen in this volume, but their basis is certainly less than clear. Also it may be questioned that such a work is the place for the publication of new taxa, fortunately mostly at the tribal level. These would have been better published in more conventional journals where similarities and differences with related taxa could be discussed at length.

However, the faults are not so serious as to reduce the usefulness or tremendous contribution of this excellent publication.

RICHARD S. COWAN, *Deputy Director*
Museum of Natural History
Smithsonian Institution
Washington, D. C.

A GUIDE TO ROCK GARDEN PLANTS. Griffith, Anna N. 320 pages, illustrated (color). E. P. Dutton and Co., Inc., New York. 1965. $5.95.

Though written for an English audience and first published in 1964 as *Collins Guide to Alpines* by Collins of London, this is a valuable reference book for American rock gardeners.

Its principal value lies in the Alphabetical List of Plants, running from page 40 to page 306. Included in the descriptive list are almost two thousand species of plants for the rock garden, mostly for sunny exposures. There are a few for the shady nooks and corners and a few rather tender ones needing frame or alpine-house culture. All are normally under a foot in height.

The plants are arranged by genus from *Acaena* to *Zephyranthes,* with an added section on dwarf conifers. Each genus is placed in its proper family and given a paragraph of general, precise description with cultural directions. After the genus paragraph is a briefer description of the major species with country of origin and occasionally details of culture.

Mrs. Griffith writes with obvious authority based on many years of experience as a scientist and gardener. She has kept up with the latest introductions, has consulted the best authorities on nomenclature, and has submerged her private preferences in the interest of precision. The only concession to personal opinion is the starring of those species and varieties considered by the author as especially desirable.

Here is no fancy writing, and what the book may lack in warmth, when compared with a Reginald Farrer, it makes up in compactness and precision. It is a much-needed book, bringing together for ready reference reliable descriptions of most of the species floridly delineated by Farrer and many of those in Sampson Clay; but most importantly of species and varieties of recent introduction.

Two hundred of these are pictured in color, six pictures to the page. These are from color photographs by the excellent photographer and horticulturist, Valerie Finnis. Careful color reproductions of her work in other publications have proved her skill and it is to be regretted that the reproductions here, for clarity and color value, are far from top quality. The pictures, however, are good enough to provide a valuable supplement to the written descriptions.

Besides the descriptive list of plants, the book includes accurate and succinct information on rock gardening in the past, plant collectors, growing alpine plants, length of life of alpines, flower succession, propagation, plant enemies, plant collecting, nomenclature, a glossary, a bibliography, and a list of sources of plants and seeds.

This supplementary material is necessarily rather abbreviated and is pitched at the English reader, but even an American rock gardener will find in these sections some usful information. The book is well worth its price and should be on every rock gardener's reference shelf for its plant descriptions and photographs.

H. LINCOLN FOSTER
Falls Village, Conn.

PASSIFLORAS FOR YOUR GARDEN. Knock, Florence. 100 pages, illustrated, indexed. Diversity Books, Kansas City. 1965. $4.95.

The horticultural monograph—a book thoroughly covering the garden plants in a genus—is uncommon today, but it shouldn't be. Mrs. Knock and the publishers of Diversity Books have demonstrated the value of such monographs with *Passifloras for Your Garden.*

Cultural information has the practical ring which comes only from personal experience. Mrs. Knock has not only grown passifloras, she has grown numerous species and she has grown them perceptively—so that she can explain what it is

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she has done and what has resulted and why.

Amazingly, Mrs. Knock has grown her passion flowers in Minnesota, wintering them in her living-room windows at first and in more recent years in a home greenhouse. A clergyman's wife, the growing of passifloras has become a hobby for Mrs. Knock, with both horticultural and religious significance.

PHIL CLARK

GARDENS MAKE ME LAUGH. Rose, James. 151 pages, illustrated. Silvermine Publishers, Inc., Conn. 1965. $4.95.

Gardens most decidedly don't make Mr. Rose laugh. More often, they make him cry—so it would seem from reading his book. And a very charming and perceptive book it is, a book which says many things which long needed saying about American attitudes toward gardening and nature.

Illustrations by Robert Osborn lend delightful accent to Mr. Rose's humorous approach to his most earnestly held opinions. Himself an eminent landscape architect, Mr. Rose sees a garden as sculpture—"Not ordinary sculpture, of course. Not the kind of sculpture that someone makes in a studio and then you walk around it and admire it from all the different angles, and mostly you have to think away everything else, to see what the sculptor had in mind. I don't mean that kind of sculpture. A garden is much bigger. Bigger in size, at least. You can walk through it. You are inside something. You have to feel you are inside something, even though you are out of doors, instead of being outside of something trying to think everything else away. A garden is sculpture from any place you are in it, even while you are in motion, and there's nothing outside that has to be thought away because that's part of it too—just as you are."

He vociferously objects to the how-to-do articles on garden design—"The magazines don't tell you how-to-do a garden. They tell you how to copy a garden." But really creating a garden is more like "trying to find out what to do with a stone and a tree and an unknown place."

"But I do think," he writes, "the kind of a garden a man gets depends on the kind of image he has of himself. In this respect, Americans are the same as Germans or Japanese or any other people for that matter. The difference is in the way they see themselves . I doubt that the average American sees himself in nature."

He complains that Americans "want gardens without the nuisance of nature's butting in." There's something wrong with almost every kind of tree; the common mulberry, for example: "A gorgeous thing that must have been fashioned out of oriental fables, but you can't use it—bird droppings, you know." Or the yellow-wood tree *(Cladrastis lutea)*—"Flowers like wisteria, bark like an athelete's skin and foliage like the night. But you can't find it. No one grows it because somebody said it was 'brittle', whatever that means."

The American garden, often, is "a cage for people to live in—not an ordinary cage, of course, but a very special cage where nobody knows who or what he is or whether the cage is supposed to keep him in or keep the 'enemy' out and which side of it is he on anyway."

The answer is to get there before the bulldozer destroys the land's lines and to "get with it." "It isn't enough just to see the raindrops make concentric circles (in a lake) and the water reflects the sky. Any idiot knows that. There's another step. You have to *be* the water and all the rest of it. Crazy? Sure it is. Now you're catching on. . . ."

PHIL CLARK

AN INTRODUCTION TO BIRDS. Kieran, John. 77 pages, illustrated (color), indexed. Doubleday and Company, Inc., New York. Copyright by J. Kieran, 19 65.$4.50.

In reading this delightful book, I felt as though I were taking a walk with the author and listening to his chatty notes on birds "in order of their abundance in our fields, woods, and dooryards." Since it describes mostly eastern birds, I had to take a mental airhop when suddenly, on page 37, the cactus wren shows up and when, on page 44, the yellow-headed blackbird, western tanager, and bullock's oriole appear.

In many descriptions, delightful phrases are used: the ruby of the ruby-crowned kinglet is not often seen "because it is like the red flag on a taxi-meter; it only goes up when the operator puts it up"; or the cedar waxwing "must be the most polite bird in all the world," followed by a description of rows of cedar waxwings on a branch "passing berries from bill to bill up and down the line." Wood ducks "feed mostly on vegetable matter with some occasional aquatic insect for dessert." The description of the road runner has to be read to be enjoyed.

In several places good comparisons of similar species are drawn as with the sparrows, gulls, terns, egrets, and mergansers.

I take exception to one statement: "In the spring the bill of the male (starling) is yellow." This holds true for both sexes.

The descriptions and the drawings of birds are very much better than the colors shown. There is a super-abundance of sky-blues, green which should be gray, blacks which are verdant greens, as in the black-crowned night heron, or the purple-brown of the head and neck of the Canada goose. Pictures of the mourning-dove, red-start, and great blue heron would be thoroughly confusing color-wise to an amateur for whom the book is ostensibly written. Except for the lack of good color, the book is worth owning.

GRACE COIT MELENEY

THE ORIGINS AND GROWTH OF BIOLOGY. Edited by Arthur Rook. 403 pages, illustrated. Penguin Books, Baltimore, Md. 1964. $1.45.

Selections from the writings of thirty-three great biologists and natural scientists from the fifth century B.C. to the nineteenth century, with a general introduction by the editor on the origins of biological thought. The readings are grouped in seven chronologically arranged sections illustrating the long history of man's observation and recording of the phenomena of life. Each section is preceded by an informative commentary and each extract is introduced by a critical account of the writer. The editor ranges from the contributions of the Greeks, with selections from Hippocrates, Aristotle, and Theophrastus, through the Dark Ages to the Renaissance and the beginnings of modern biology in the sixteenth century, the development of the microscope and the resulting significant advances in the biological sciences during the late seventeenth and eighteenth centuries, and on to the great biological syntheses of the nineteenth century. This book is invaluable for anyone wanting ready access to an excellent sampling of some of the most significant sources for the history of biology from the earliest times to the present. Students of botany will find it particularly interesting and useful for its carefully chosen selections from the writings of Robert Hooke, Stephen Hales, Linnaeus, Lamarck, Darwin, Mendel, and DeVries.

MULFORD MARTIN

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Robert Breach, Curator of Publications

BRIEF NOTES ON RECENT BOOKS

FLOWER ARRANGEMENT

FLOWER DESIGN WITH ACCESSORIES. Soutar, Merelle. 177 pages, illustrated, (part color), appendix. D. Van Nostrand Co., Inc., Princeton, N. J. 1965. $6.95.

The use of figures and other objects of plant and non-plant material to illustrate or interpret the titles assigned to flower compositions in flower show schedules is skillfully explained by the author. She also discusses flower compositions for the home as well as for exhibition and illustrates her ideas and suggestions with her own pen and ink sketches, also with black and white and colored photographs.

Mrs. Soutar, who has been teaching the art of arranging flowers in London and elsewhere in Great Britain for a number of years, already has two books and many magazine articles on the subject to her credit.

THE JAPANESE WAY WITH FLOWERS. Carr, Rachel E. 128 pages, illustrated, appendix. Harper & Row, Publishers, Inc., New York, N. Y. 1965. $4.95.

Mrs. Carr, who resided in the Orient for a number of years, has sympathy for and understanding of Japanese styles of arranging flowers. Because of this she is able to explain clearly for an American audience how to create arrangements in the Japanese manner, both traditional and modern.

The charming charcoal illustrations were made by her son Alain who spent his childhood in Japan and China.

HERBS

PLEASURES OF HERBS. Hatfield, Audrey Wynne. 186 pages, illustrated. St. Martins Press, New York. 1965. $3.95.

This book, which was originally published in 1964 in Great Britain by Museum Press Limited, will delight those in this country who grow herbs in their garden, or on their window-sills, and use them in their kitchens. The history and lore of many of these plants is related, and a pleasing line drawing by the author accompanies the description of each plant.

SHRUBS

THE AZALEA BOOK. Lee, Frederic P. 435 pages, illustrated, indexed. D. Van Nostrand Co., Princeton, N. J. 1965. $12.00.

This second edition of *The Azalea Book,* first published in 1958, has been extensively revised, new topics and new material being incorporated, and it is published in a new format

TREES

ORNAMENTAL TREES FOR HOME GROUNDS. Perkins, Harold O. 192 pages, illustrated, indexed. E. P. Dutton & Co., Inc., New York. 1965. $4.50.

The author, a landscape architect, and Professor Emeritus of Landscape Design at the University of Connecticut, has written a book which will be especially helpful to property owners who want to know how to choose trees which are suitable for their particular conditions and are worth owning, and how to take care of them

The contents, which are presented in a precise, yet pleasant-to-read style, are divided into three sections: Planting and Care: A Variety of Forms: Descriptive Lists and Landscape Uses.

TROPICAL TREES (OF THE CARIBBEAN). Hargreaves, Dorothy and Bob. 64 pages, illustrated (color). Hargreaves Industrial. Portland, Ore. 1965. $3.50.

In this companion book to *Tropical Blossoms of the Caribbean,* the Hargreaves present tropical trees which are of interest to the traveler—trees which serve mankind by providing fine furniture, food, medicines, spices, etc.—in alphabetical order under their common names in the several languages used in Central and South America, Mexico, and the Caribbean Islands. Each tree is illustrated in color and accompanied by concise text.

BALSAM FIR—A MONOGRAPHIC REVIEW. Bakuzis, E. V. and H. L. Hansen. 445 pages, illustrated, indexed (general, species, localities), appendices, literature cited. University of Minnesota Press, Minneapolis. 1965. $9.50.

Professors Bakuzis and Hansen of the School of Forestry, University of Minnesota, have prepared an exhaustive survey of the balsam-fir, *Abies balsamea,* with the assistance of several co-authors in certain particular fields.

The book, which depicts the place of the balsam-fir in nature, forestry practice, and industry, will appeal not only to managing forestors, entomologists, pathologists, and educators, but also to conservationists and wildlife biologists. It has an attractive frontispiece drawn by the noted nature artist Frances Lee Jacque.

MISCELLANY

GENTLE WILDERNESS: THE SIERRA NEVADA. Muir, John (text), Richard Kauffman (photographs). 167 pages, illustrated (color). Sierra Club, San Francisco. 1964 (rec'd. 1965). $25.

This is another one of the Sierra Clubs excellent publications, the purpose of which is to remind everyone that "neither California nor the rest of America is rich enough to lose the Gentle Wilderness, nor poor enough to need to." These words are quoted from David Brower, the executive Director of the Sierra Club. This club, which was founded by John Muir in 1892, is devoted to the study and protection of national resources, particularly of mountainous regions.

Mr. Kauffman's superb photographs have been artfully combined with text condensed from John Muir's *My First Summer in the Sierra.*

KEER-LOO—THE TRUE STORY OF A YOUNG WOOD DUCK. Foster, Laura Louise. 80 pages, illustrated. Naturegraph Publishers, Healdsburg, Cal. 1965. Paper $1.25; hard-bound $3.25.

The raising of a wood duck in a New England home is delightfully related by Laura Louise Foster. An illustrator of nature subjects, she has also drawn the pleasing pen and ink sketches for this book.

This reviewer saw Keer-Loo and the other ducklings in a bathtub of the Foster's home during the annual meeting of the American Rock Garden Society in Falls Village, Connecticut, in May, 1960.

Keer-Loo will appeal to young and old alike, who appreciate the joy that is derived from an association with nature's creatures.

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HOW TO GROW ALMOST EVERYTHING. Schuler, Stanley. 256 pages, illustrated, indexed. M. Evans and Company, Inc., New York. 1965. $3.95.

Mr. Schuler very nearly accomplishes what his wide-open title promises—to describe *How to Grow Almost Everything*. He covers all climatic zones of this widely varied country and discusses most horticultural plants. And while this isn't quite "almost everything," he approaches it.

He does fairly well on the "how to" side of his promise as well. The book is kept compact, in spite of its coverage, by eliminating most illustrations and by describing only the most widely known species and listing only the salient cultural features.

GROWING AUSTRALIAN PLANTS. Lothian, Noel and Ivan Holliday. 166 pages, illustrated (color), indexed. Tri-Ocean Books, San Francisco. 1964 (rec'd. 1965). $5.25.

Noel Lothian, Director of the Adelaide Botanic Gardens, and Ivan Holliday, a successful gardener, have combined their talents and wide knowledge of plants in this book for home gardeners of the vast Australian continent on which the climate varies from that of the desert, that of the temperate rain forest to subtropical and tropical. A section is devoted to plant-types in relation to soil and climatic conditions.

Growing Australian Plants may interest gardeners in California where some Australian plants are grown.

DEADLY HARVEST. Kingsbury, John M. 128 pages, illustrated, indexed. Holt, Rinehart & Winston, Inc., New York. 1965. $4.50.

The author, who has to his credit a technical book on poisonous plants widely used by physicians and veterinarians, has written a popular guide for householders who want to protect their families from the effects of such plants. It will make an interesting and valuable addition to the home library.

THE ECONOMICS OF SOIL CONSERVATION. Bunce, Arthur C. 227 pages, indexed. University of Nebraska Press, Lincoln. 1965. $1.30, paper.

This as a Bason Book edition from the fourth printing (1950) of the book originally published by the Iowa State College Press in 1942.

PLANT HYBRIDIZATION BEFORE MENDEL. Roberts, H. F. 374 pages, illustrated, indexed. Hafner Publishing Co., New York. 1965. $6.75.

This is a facsimile of the original (1929) edition of *Plant Hybridization before Mendel*, which is considered to be "the standard history of the subject."

CELLULAR ULTRASTRUCTURE OF WOODY PLANTS. Cote, Wilfred A., Jr. (ed.) 603 pages, illustrated, author index. Syracuse University Press, Syracuse, N. Y. 1965. $14.00.

This volume represents the Proceedings of the Advanced Science Seminar held at Pinebrook Conference Seminar in September, 1964. The thirty papers are presented in five categories: wood cells—their formation, growth, and differentiation; wood constituents—their biosynthesis, ultrastructure, and physical characteristics; the wood cell wall—its ultrastructure; reaction wood—its causes, formation, and ultrastructure; and physiocochemical properties of wood and wood fibers.

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NATIVE VEGETATION OF NEBRASKA. Weaver, J. E. 185 pages, illustrated. University of Nebraska Press, Lincoln. 1965. $4.75.

To tell the story of the vegetation of Nebraska—the grasslands, meadows, marshes, windblown sand hills, deciduous and pine forests—to the greatest audience, Professor Weaver has translated scientifically correct descriptions into layman's language.

Professor Emeritus of Plant Ecology at the University of Nebraska, a member of the editorial board of *Ecology*, and a former president of the Ecological Society of America, Prof. Weaver is well versed in ecological matters and is author or co-author of more than a hundred articles. *Native Vegetation of Nebraska* is his sixteenth book.

SYSTEMATIC GUIDE TO FLOWERING PLANTS OF THE WORLD. Manning, S. A. 302 pages, illustrated, indexed. Taplinger Publishing Co., New York. 1964 (rec'd. 1965). $10.00.

Nearly four hundred species are described concisely but adequately, enabling horticulturists, gardeners, and others with a more or less limited acquaintance with botany to acquire some knowledge of plant characteristics and to become familiar with the principles of classification. The book should arouse sufficient interest to spur the reader to continue into more advanced study and to introduce him to the use of a complete Flora.

The author, a Fellow of the Linnean Society of London and of the Botanical Society of Edinburgh, is author of many scientific papers and of several popular books on natural history and kindred subjects.

Systematic Guide to Flowering Plants of the World was originally published in England in 1964.

ADVENTURES IN LIVING PLANTS. Kurtz, Edwin B. Jr., and Chris Allen. 120 pages, illustrated, indexed. University of Arizona Press, Tucson. 1965. $4.95.

Dr. Kurtz, Professor of Botany at the University of Arizona, and Chris Allen, a sixth-grade teacher in the Tucson public school system, have collaborated in preparing a book which will excite the interest and appeal to the imagination of young folks. It is profusely illustrated by skillful and original drawings and by black and white photographs.

WANDERING THROUGH WINTER. Teale, Edwin Way. 370 pages, illustrated, indexed. Dodd, Mead & Co., New York. 1965. $6.50.

This is the last of a quartet of books in which this imaginative naturalist has made a survey of the American continent through the seasons. The same enthusiasm, breadth of interests, and freshness of view point which characterized *North with the Spring, Journey into Summer,* and *Autumn in America* are discerned in *Wandering through Winter.*

NEWS, NOTES AND COMMENTS

(Continued from page 265)

Thomas P. Reilly, Founder and President of the Ra-Pid-Gro Corporation, Dansville, New York, died of a heart attack on August 31, 1965, at eighty years of age.

Mr. Reilly achieved nation-wide distinction for his pioneer work in the field of plant nutrition. In October, 1959, he was the recipient of a citation from the American Horticultural Council "for demonstrating in a practical way that plants could be fertilized through their leaves; for being the first to develop and market an effective plant food for foliar feeding; and for opening the way to a new cultural practice in horticulture."

In the early 1900's he began his experimental work toward perfecting a plant food suitable for absorption through the foliage. Against the opposition of many who said it was impossible to feed plants other than through the roots, Mr. Reilly perfected an effective formulation in 1932, the first development of the Ra-Pid-Gro water-soluble plant food.

Today foliar feeding is common practice for home gardeners, nurserymen, orchardists, market gardeners, and other professional horticulturists.

LEST WE FORGET

by Jack Focht

On the occasion of his inauguration as second president of the Torrey Botanical Club in 1873, Dr. George Thurber looked forward to the day when his generation would have followed "the great botanist" into the hereafter, and younger botanists, having joined the Club, would rightly ask, "What manner of man was this whose name you bear?" He concluded that John Torrey's name was to be held in sacred trust by the Club in order to advance botanical science which Dr. Torrey "loved so much and for which he did so much."

Thus it becomes a matter of historical necessity that the Club be true to this trust and raise nine hundred dollars to renovate and buy perpetual care for Dr. Torrey's grave at Long Hill Cemetery in Stirling, New Jersey.

On a tip from Dr. John Small, I went to Stirling last June to locate the grave. I sent him the following note the morning after the discovery: "My search ended in a tidy little cemetery, but Torrey's grave is in the midst of the worst patch of poison ivy imaginable. The whole family is buried there . . . Torrey's two grandsons, his son Herbert and his wife Marie, Torrey's three daughters, and, of course, the Professor and his wife Eliza. The plot is completely overgrown, and wading around in the underbrush during a thunderstorm left me drenched, scratched, and covered with mosquito bites. The adventure was like finding some rare plant when no discomfort can hold one back."

Dr. Torrey died of pleurisy at his Columbia College residence on 50th Street, at 6 p.m., Monday, March 10, 1873. The funeral services were held on Thursday at 3 p.m. in the West Presbyterian Church on 42nd Street. His funeral notice observed that "the profuse offerings of flowers to mark affection for the dead were certainly never more appropriate." But poison ivy ninety-two years later is too great a botanical indignity to even label as irony.

On March 14th, the morning after the church service, his remains were interred in a rosewood coffin at Woodlawn Cemetery in the Bronx. Years later when Dr. Small tried to locate the grave, cemetery authorities informed him that the body had been transferred to Stirling, New Jersey, on April 29, 1873. It was this information that inspired my trip last June.

Returning to Stirling six months later on November 3, 1964, I found the plot cleared, and big piles of blackhaw, sassafras, and greenbrier thrown to the side. Inquiry led me to Mrs. Emmett Herrmann, Secretary of The Long Hill Cemetery Association, who has been working with her husband to clear the Torrey property.

Back in 1890, Doctor Torrey's son and grandson, Herbert and John Gray Torrey, were among nine local residents who met at the Torrey home to form The Long Hill Cemetery Association. Herbert served as the Association's first secretary, and following his example, Mrs. Herrmann has been trying to build a cemetery of which Stirling can always be proud.

Last year a perpetual care plan was set up to further the renovation of the cemetery, but there are no living, direct descendants of Dr. Torrey who could contribute to this plan. The Herrmanns have been doing the renovation themselves, finding it practically impossible to enlist volunteers to help in the work.

The Torrey family owns three plots totaling seventy-eight by thirty-one feet. The perpetual care plan costs thirty-five dollars per grave, or three hundred dollars for each full-size plot. Each of the Torrey plots could accommodate eighteen graves, and nine hundred dollars for the three plots seem like a very reasonable price.

There is much work to be done. Two stones are down, and one of them is broken. Dr. Torrey's monument is leaning and needs resetting. A dirt road was cut through one of the plots by a building contractor who needed a quick access to his development. This road should be closed off, and the gap through the plot relandscaped before it becomes an established thoroughfare. One plot ending at the top of the Erie-Lackawanna Railroad embankment should be landscaped and screened with evergreens. There are also many roots and stumps to be grubbed out of the recently cleared ground.

Two of the plots contain members of Dr. Torrey's daughter's-in-law family, but the whereabouts of Mrs. Herbert Torrey's family, Snow and Albinola, are unknown. Torrey memorabilia may be in their possession, and immediate efforts should be made to locate them and ask for their permission and help in launching this project.

A pilgrimage to Stirling is in order. A work trip would be welcomed by the Cemetery Association. The Passaic River's banks, nearby farmland, and swampy woods beckon with flora. Afterwards, let us return and raise the nine hundred dollars.

Reprinted with permission from "Torreya"—*Bulletin of the Torrey Botanical Club,* Vol. 92, No. 4.

LETTERS TO THE EDITOR

The July-August, 1965, issue of *The Garden Journal* showed the Gould family home in Tarrytown, New York [see Spring Garden Tour], so this may interest you. At Holy Cross Episcopal Church here, there is an old church yard. I found some old roses growing in it; one, a large, old 'Louise Odier' (Bourbon) which was planted in 1902. This rose is rather rare. The huge bush had been broken in two by a storm years ago, but it continues to bloom every year.

I noticed another stunning rose, most unusual in form and color—the color of the true 'American Beauty'. I asked an old member of the Church about it, who told me it was 'Helen Gould', which had been planted about the same time as 'Louise Odier'. *Modern Roses IV* says this rose was introduced into the United States as 'Helen Gould' in 1901 by Dingee and Conard. It was formerly called 'Balduin'. Fascinating the things one runs into in the search for old roses —and how much history they reveal. 'Louise Odier' dates back to 1851.

Kitty Simpson
Shreveport, La.

The Garden Journal is a delight. The July-August issue had me reading almost every article. The articles on British nineteenth-century gardening and on "Plant Lore of a Midsummer-Night's Dream" I found fascinating. (My wife and I are now leaving for the Shakespeare Festival in Stratford, Ontario.)

I was thrilled when I saw the article on the mushroom stamps. I have two books of the botanical pictures of the Czech, Mr. Svolinksy, which I treasure.

Lawrence Hochheimer
Norwalk, Conn.

NEW MEMBERS

Life

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DOROTHY EBEL HANSELL
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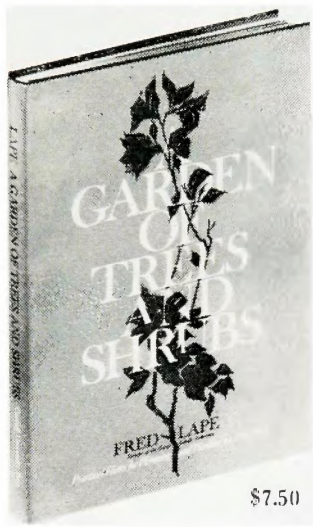

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Michael F. Tobin
Thomas Treacy
Mrs. Lowell E. Ullery
Mrs. Esther Vurnakes
Miss Frances A. Weber
Mrs. John H. Wilson
Mrs. M. Youner
Miss Linda Zanti

*Change in classification

Scientific tree care brings results

SPRAYING

BRACING

CHEMOTHERAPY

ROOT SURGERY

CAVITY FILLING

INVIGORATING

Scientific tree care recognizes no seasonal limits. There are always forces working against a tree's health—insects, chemicals, under-nourishment, droughts, diseases, sleet, wind and lightning are continually taking their toll. Only regular tree care based on scientific research and practical training brings satisfactory results. Call a qualified Bartlett representative today and have him give you a definite program for the care of your trees.

BARTLETT TREE EXPERTS

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